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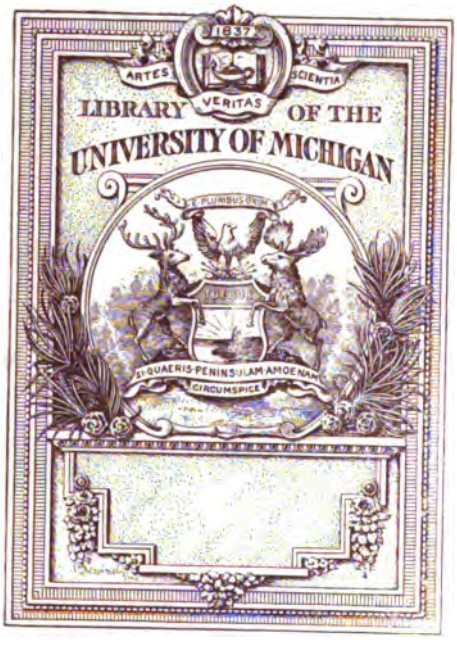
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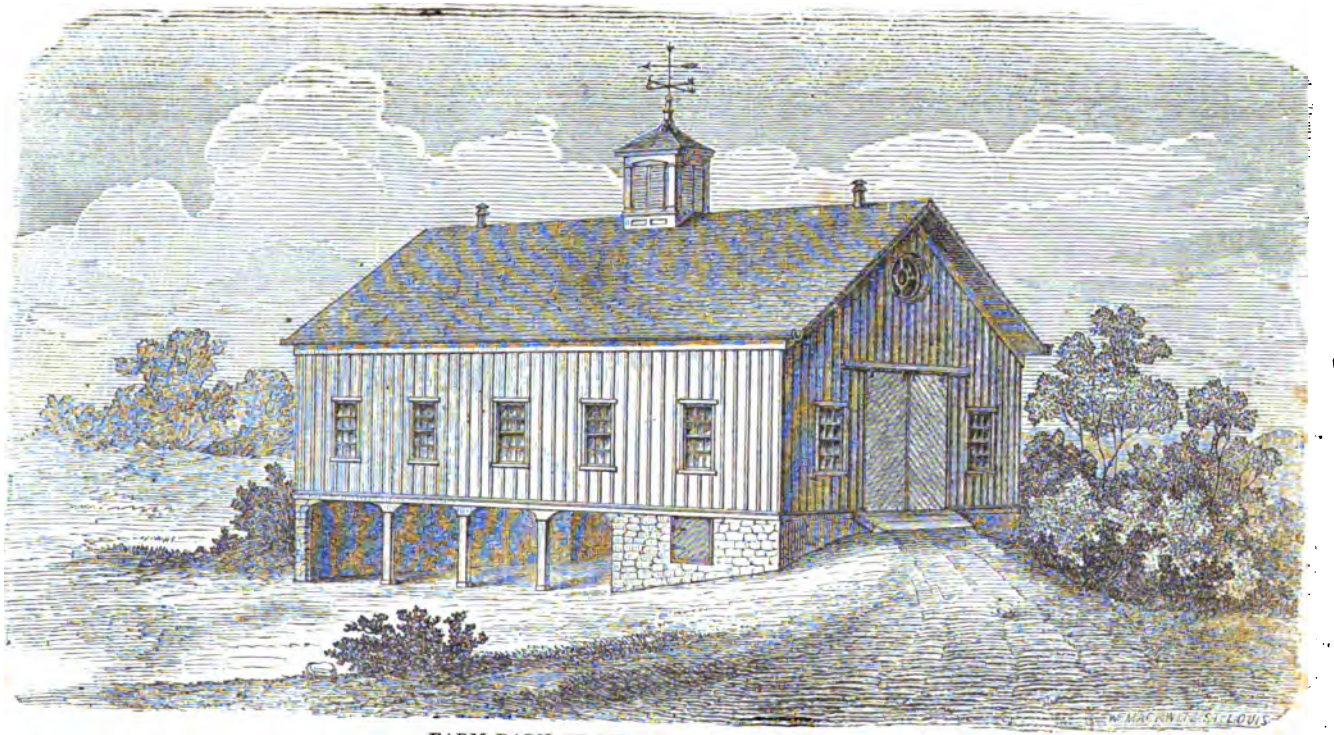

FARM BARN OF LEONARD B. HOLLAND, Esq.

FIRST ANNUAL REPORT

OF THE

MISSOURI STATE BOARD OF AGRICULTURE,

WITH

AN ABSTRACT OF THE PROCEEDINGS

OF THE

COUNTY AGRICULTURAL SOCIETIES,

TO THE

GENERAL ASSEMBLY OF MISSOURI, FOR THE YEAR 1865.

SECOND SERIES.

Resolved, by the General Assembly of the State of Missouri: That three thousand additional copies of the Agricultural Report of Missouri be printed for the use of the General Assembly; the same to be distributed among the members thereof by the Secretary of State as other public documents.—*Approved March* 19, 1866.

JEFFERSON CITY:
EMORY S. FOSTER, PUBLIC PRINTER.
1866.

MEMBERS OF THE STATE BOARD FOR 1865–6.

HENRY T. MUDD, *President*, Kirkwood, St. Louis County.
L. D. MORSE, *Corresponding Secretary*, St. Louis County.
FREDERICK MUENCH, *Treasurer*, Femme Osage, Warren County.
WM. T. ESSEX, Kirkwood, St. Louis County.
GEORGE R. BUCKNER, Naylor's Store, St. Charles County.
GERT. GŒBEL, Campbellton, Franklin County.
BARNABAS SMITH, Cuba, Crawford County.
GEORGE HUSMANN, Hermann, Gasconade County.
C. A. NEWCOMB, Tyro, Jefferson County.
FRANCIS KELLERMAN, Cadet, Washington County.
JOHN H. TICE, *Recording Secretary*, St. Louis.

LIST OF THE MEMBERS OF MISSOURI STATE BOARD OF AGRICULTURE FOR 1866.

HENRY T. MUDD, *President*, Kirkwood, St. Louis County.
WM. T. ESSEX, *Treasurer*, Kirkwood, St. Louis County.
L. D. MORSE, *Corresponding Secretary*, St. Louis.
FREDERICK MUENCH, Femme Osage, Warren County.
GEORGE R. BUCKNER, Naylor's Store, St. Charles County.
GERT. GŒBEL, Campbellton, Franklin County.
BARNABAS SMITH, Cuba, Crawford County.
J. W. HARRIS, Columbia, Boone County.
C. A. NEWCOMB, Tyro, Jefferson County.
FRANCIS KELLERMAN, Cadet, Washington County.
JOHN H. TICE, *Recording Secretary*, St. Louis.

NOTICE.

In presenting this first annual report of the Board of Agriculture to the farmers of Missouri, a brief reference to its character may be excusable. We were obliged to rely for information in regard to the agriculture of the counties generally upon answers to the circular which was issued. We could not know, except to a very limited extent, the most reliable and competent persons to whom to address circulars, and our information obtained by this means is limited and sometimes, possibly, incorrect. So far as the Board of Agriculture is concerned, this could not have been avoided; the course pursued was the only feasible one, considering the lack of funds and the short time we have had to devote to the work.

In presenting a general view of the condition of Agriculture in Missouri, we have given such views as were deemed correct and most profitable, based upon such information as we possessed, and we have directed attention to such channels or modes and means of improvement as seemed desirable and most likely to be found interesting and available.

The few County Reports received will be found interesting and useful. Among them are some good examples or patterns which will be useful to others in making future reports. The most thorough report, prepared with great care, is perhaps that from Clark county. The greatest objection to it is its length, and in that respect it cannot be commended to others as an example, simply because many such reports, however good, would make a State report quite too voluminous. One advantage is gained: the ground having been gone over once so thoroughly, future reports may be the more brief.

Among the Essays and Addresses are several papers which were written some years ago, but were considered of sufficient interest and value to be worthy of preservation as a part of the agricultural literature of the State. A few articles have been selected on account of their peculiar interest to the people of this State. Prominent among

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such is the one on "A Home Market for Our Crops." The manufacturing interest of Missouri has been sadly neglected, to the great detriment of our prosperity. It is second only to our agricultural interest in importance, and should be encouraged by every means within the province of the Legislature or the people.

The address by Judge Newcomb, in favor of organizing county societies, we hope will be read with interest.

The essay by Mr. Madison, on "The Relation of Agriculture to Population, and its Influence on Civilization," is a production of rare merit, very interesting in its historical character, and may be read with interest and profit by the statesman or the agriculturist.

The articles on Hay Making and Poultry, are of a plain, practical character, which will be appreciated.

On the whole, we trust that this report will be considered a very good beginning under the circumstances, and a fair promise of the future usefulness of the Board of Agriculture. With more experience and the necessary aid and encouragement from the General Assembly, there will be reason to expect something better and more complete.

L. D. MORSE, *Corresponding Secretary.*

JANUARY, 1866.

BOOKS, PAMPHLETS AND PAPERS

RECEIVED BY DONATION AND FOR EXCHANGE.

Colonel B. P. Johnson, Corresponding Secretary New York State Agricultural Society, Albany, New York: Transactions New York State Agricultural Society, four volumes, 1860, '1, '2, '3, '4; Report on International Exhibition of Industry and Art, London, 1862, by B. P. Johnson, United States Commissioner: two addresses on insects and curculio, by Asa Fitch, M. D.; New York State Agricultural College Charters, Ordinances and Regulations, 1853.

John H. Klippart, Columbus, Ohio, Secretary Ohio State Board of Agriculture: Ohio Agricultural Reports, 1859, '60, '61, '62, '63; twelve copies Address on Agricultural Colleges, by John H. Klippart; ten volumes Ohio Agricultural Report, 1864.

S. L. Goodale, Saco, Maine, Secretary Maine Board of Agriculture: Agriculture and Geology of Maine, 1861 and 1862; Agriculture of Maine, 1863 and 1864; Agriculture of Massachusetts, 1863.

Sanford Howard, Lansing, Michigan, Secretary of the Michigan Board of Agriculture: Report of Michigan Board of Agriculture, 1864; Catalogue Michigan Agricultural College, 1863.

W. H. Loomis, Indianapolis, Indiana, Secretary Indiana State Board Agriculture: two volumes Indiana Agricultural Reports, 1853; two volumes, 1854–5; one volume, 1856; two volumes, 1857; two volumes, 1858; four volumes, 1859–60; Premium Lists.

J. M. Shaffer, Fairfield, Iowa, Secretary: Iowa Agricultural Reports, 1861–2, and 1863; Fourth and Fifth Annual Reports Iowa Agricultural College and Farms; Premium Lists.

A. Boyd Hamilton, Harrisburg, Pennsylvania, President: complete set—volumes 1, 2, 3, 4, 5, Transactions Pennsylvania State Agricultural Society; Premium Lists.

J. W. Hoyt, Madison, Wisconsin, Secretary: Transactions Wisconsin State Agricultural Society, 1852 to 1860, inclusive.

John P. Reynolds, Springfield, Illinois, Corresponding Secretary: Transactions Illinois State Agricultural Society, four volumes, 1853 to 1860, inclusive.

M. J. Perrault, M. P. P., etc., Montreal, Canada: volume four, Lower Canada Agriculturist; volume four, Revue Agricole.

N. J. Colman, St. Louis: Report of the California Board of Agriculture.

Monthly Reports of the Department of Agriculture, Washington, D. C.

Newspapers and Magazines: Journal New York State Agricultural Society, Albany, New York; Missouri Beacon, O. A. A. Gardner, Mexico, Missouri; Franklin County News, James G. Magann, Washington, Missouri; Columbia (Missouri) Statesman, W. F. Switzler, Columbia, Missouri; Missouri State Times, Foster & Cooper, Jefferson City, Missouri; Colman's Rural World, N. J. Colman, St. Louis; Prairie Farmer, Emery & Co., Chicago.

MISSOURI STATE BOARD OF AGRICULTURE.

BY-LAWS.

SECTION 1. The officers of the Missouri State Board of Agriculture shall consist of a president, vice president, recording secretary, treasurer and corresponding secretary.

SEC. 2. It shall be the duty of the president to preside at the meetings of the Board, to sign all warrants on the treasurer ordered by the Board, and to perform such other duties as are or may be required by law. He shall be, *ex-officio*, chairman of the executive committee. In his absence the vice president shall perform his duties.

SEC. 3. It shall be the duty of the recording secretary to keep and preserve the minutes and records of the Board and the proceedings of the executive committee, to furnish a copy of the same for publication previous to the expiration of his term of service, and to countersign all warrants on the treasurer for money.

SEC. 4. The treasurer shall keep the funds of the Board, and pay all warrants drawn by the order of the Board, signed by the president and countersigned by the secretary, and shall make his report, at the annual meeting in December, of his receipts and expenditures, from whence received, and to whom paid, properly arranged for publication. He shall give bond in such penal sum as may be required by the Board for the faithful performance of his duties and the payment of all moneys in his hands.

SECT. 5. It shall be the duty of the corresponding secretary to conduct all correspondence with societies and individuals, to issue such circulars for obtaining statistics or other information as the Board may direct or as he may deem expedient or useful, to collate and arrange the correspondence, proceedings of the Board, and the proceedings of county societies for report and publication as required by law, and to distribute to county societies and others entitled to them all seeds, plants, publications, etc., which may be acquired by the Board for distribution. His term of office shall hereafter commence on the first day of February, and continue one year, and until his successor is elected.

SEC. 6. The annual election for officers of the Board shall be held as early as possible after the adjournment of the annual December meeting. The officers then elected, except the corresponding secretary, shall hold office from the first of January following, and until their successors are elected.

SEC. 7. The president, vice president and recording secretary shall constitute an executive committee, whose duty it shall be to inspect and audit all accounts, and to perform such other duties as may be required of them in the intervals between the meetings of the Board.

SEC. 8. The necessary expenses of the officers and corporate members in attending meetings of the Board shall be paid out of the treasury.

SEC. 9. The president shall have authority to call special meetings of the Board whenever he may deem it necessary or important to do so.

SEC. 10. Five of the corporate members shall be necessary to constitute a quorum at all meetings except the annual meeting.

SEC. 11. These by-laws may be altered or amended at any time by a majority of the members present and voting, provided that any member proposing to amend the by-laws at any meeting of the Board shall give two weeks' notice prior to said meeting to all the incorporated members, or their successors in office, of such intended motion to amend.

Adopted March 28, 1865.

REPORT

OF THE

CORRESPONDING SECRETARY.

To the General Assembly of the State of Missouri:

The Missouri State Board of Agriculture was organized on the 13th of March last, (1865) pursuant to an act of the Legislature. At a subsequent meeting held on the 28th following, the board adopted by-laws for its government, and at that time the office of Corresponding Sectary was created.

The seventh section of the act of incorporation requires the annual report of the Board of Agriculture to embrace, among other matters specified, "*a general view of the condition of agriculture throughout the State.*" Owing to the facts that the board was organized but a few months since, and with no means to prosecute the work thoroughly; that nearly all the county agricultural societies were broken up during the war by the ravages of contending armies in our State; and that the great majority of the counties have failed to respond properly to the circulars which were sent to them asking for the necessary information, it will be impossible to give such a full and correct view of the condition of agriculture throughout the State as the law undoubtedly contemplates and as would be interesting and useful.

The report from St. Charles county, which will be found in another part of this volume, gives a very complete and interesting history of the agriculture of that county from its first settlement to the present time. The writer, Mr. Jos. H. Alexander, has performed a very important service for the county and the State. The history of the early settlement of that county by the French will be read with interest. A similar review of the past and present condition of agriculture of Missouri would be valuable. Much of interest and instruction would undoubtedly be found in even a brief review of the past. In the brief space of time since the Board of Agriculture was established and the office of Corresponding Secretary created, and with the numerous duties devolving upon the office in the beginning of the enterprise, it would have been too great a tax upon one individual to have gained the

information necessary to treat of the past satisfactorily. Information in regard to the history and success of the various agricultural organizations of the State has been asked by circular and by letters, but only in a very few instances has such information been received; thus leaving us to infer a degree of apathy that does not speak very favorably of the agricultural enterprise of the parties concerned, or else a want of knowledge of, or appreciation of the importance of the duties imposed by the Legislature upon the Board of Agriculture.

Under the circumstances, little more can be done than to allude to some of the more prominent features of the past. Probably it is quite as well that it is so, for indeed, with the exception of some of the more important counties, very little of a creditable character can be said of the past agriculture of the State. It has been chiefly of the pioneer style, and not the best phase of that. The present is full of encouragement and bright prospects, promising a rich harvest and a glorious future.

By an act of the Legislature, approved February 24, 1853, the Missouri State Agricultural Society was incorporated—the first society of the kind ever organized within our limits under the patronage of the State. This society held its first fair in the same year at Boonville, and appropriated one thousand three hundred and fifty-one dollars and fifty cents in premiums. The annual address was delivered by Urial Wright, of St. Louis. It was a very valuable and appropriate address, well worthy of preservation, and we accordingly give it a place among the essays of this volume. It is no less valuable or appropriate now than it ever was, and should be read with no less interest on account of the fact that its author has since, unfortunately for himself, gone to rebeldom. He alludes with stirring eloquence to the greatest patriots and statesmen of the nation—the proprietors of Fort Hill and the Hermitage, Marshfield and Ashland, Monticello and Montpelier, and, rising high above them all, Mount Vernon, and says: "Differing widely as to the actual adjustment of power in our federation system, and sometimes apart upon the measures of policy—no dissension ever came between them as to the true position of agriculture. They loved the fields, and with a love that defied the intoxicating influences of power and the seductive spell of high station. Their graves are *farmers'* graves."

Perhaps the most interesting feature of the address to us at this time, is the author's earnest advocacy and powerful arguments in favor of agricultural education, delivered more than twelve years ago; the good seed seems to have fallen upon stony ground, for not much of a harvest is yet perceptible. It is an instance of the patient and prolonged effort required to effect great improvements in agriculture.

The second annual fair was held at the same place in the year following. The amount appropriated in premiums was two thousand six hundred and fifty-two dollars and eighty-eight cents. The annual address was delivered by General James L. Minor, of Jefferson City.

It is a thorough argument in favor of progressive and improved farming, and treats pointedly of many of the errors in our present system of farming, among them, the common one of cultivating too much land; the insane desire of adding acre after acre to our possessions; the superficial tillage and the wasteful methods of gathering and feeding. The author is still upon his farm near Jefferson City, the same earnest friend of agricultural improvements and a contributor to this report.

At a May meeting of State Society in 1854, a resolution was adopted appointing a committee to memorialize Congress on the subject of agriculture, and the establishment of a school of agriculture, and for a donation of the public lands for the endowment of the State Agricultural Society.

At the October meeting in the same year, the following resolutions were adopted upon an important subject, which should demand the attention of the Legislature at this time, and upon which we shall have something more to say in another place:

"*Resolved*, That the General Assembly of this State is respectfully requested to direct the State Geologist to give special attention to the agricultural interests of the State; to examine the mechanical and chemical properties of all soil and fertilizers; point out the several varieties of soils and the capacities and peculiar properties of each, together with the crops and culture and fertilizers adapted to them respectively, and designate the trees and other plants which grow upon and characterize them, and lay down upon the map, so far as may be, the territory occupied by the several soils.

"*Resolved*, That, in our opinion, the office of State Geologist should be continued until the survey of the whole State is completed.

"*Resolved*, That the foregoing resolutions be referred to the committee heretofore appointed to memorialize the Legislature on the subject of the interests of this Society."

In 1855, the third, and we believe the last annual fair of the State Agricultural Society was held. Afterwards, four or five district associations were formed, for the purpose, mainly, it is presumed, of holding fairs which would more perfectly represent the different sections of the State. We do not know what degree of success attended these district organizations, nor do we know why the State society was abandoned. One great defect in the organizations referred to, we think, may be plainly inferred from the fact that so little is now generally known of the results of their labors. Organization is very important. There are many things that cannot be accomplished by unaided individual enterprise. All things within human power may be accomplished by systematic organization and combination. This has been found as true practically, in regard to agriculture, as anything else. The purpose of organization with us, is to develop important facts; to excite interest; to elicit information by various means in regard to our calling; and then last, but not least, to spread a knowledge of the same among the producing classes. The holding

of fairs is but a part, perhaps we may say a small part, of the important work which should be done by agricultural organizations. It is the publication of proceedings and results which has contributed chiefly, beyond a doubt, to make the agricultural organizations of other States immensely useful and prosperous.

From the time of the organization of the State Agricultural Society to the breaking out of the war, numerous county societies were organized. Most of them have been successful. One, the Gasconade County Society, organized in 1857, has continued to hold its annual fairs without interruption up to the present time. A large proportion of these societies have been organized on the joint stock principle, and many of them complain of want of success financially. In my opinion this plan is not the best one for county societies. Such societies should receive a fair amount of aid, annually, if necessary, from the State, or from the county treasury, and the law of the State provides for it. In addition to this, it is believed to be better to depend on annual and life membership fees for support. In this way a larger number of the farmers and mechanics may be made more directly interested, and they will naturally regard the institution as more essentially theirs, and the fairs as their fairs. If there is not interest enough taken to support a society successfully on this plan, it is doubtful whether they can be well sustained on any other, except, perhaps, where there are quite large towns. The joint stock plan has undoubtedly been adopted by many counties in consequence of the eminent success of the "St. Louis Agricultural and Mechanical Association."

This association was chartered by the Legislature December 7, 1855. It has held five annual fairs, appropriating about sixteen thousand dollars annually in premiums. Its annual receipts, in 1860, reached the sum of forty-seven thousand two hundred and thirty-one dollars and eighty cents, and it was estimated that one hundred thousand persons were on the grounds on the day of the visit of the Prince of Wales and the royal party. The fairs of this association have obtained a world-wide fame. Since the commencement of the war the grounds and the buildings have been occupied by the military authorities, and no fairs have been held, but it is presumed that the association will resume operations again, with the energy and enterprise of former times, in the coming year.

The agriculture of Missouri may be said to be in a transition state, although not the kind of transition which has been observed in some of the older states eastward of us. There the transition has been made, or is going on, from a system of depletion, a constant drawing of wealth from the soil, with little or no effort to secure continued fertility, to a system of "improved agriculture," which recognizes the great law of nature that the soil cannot continue to *give* without being replenished with the material. The former system prevails in all new countries where labor is scarce and manures not plenty, and where

the virgin soil produces abundantly without manure and with comparatively little labor. And again, the class of pioneers are not generally men of the most advanced ideas of farming. They lead the way, open up the country, make improvements, establish schools and churches, do a vast deal of good, and flourish like a "green bay tree," until population thickens around them and their lands begin to fail to yield remunerative crops with the same skill and labor formerly required, and then they seem to know no resource but to sell out and go further west, get new land and repeat the same system. A useful class of people they are, and if they are satisfied with their system, it is not easy to see why any one else should find fault with it. Among the great mass of immigrants now flocking to Missouri, it remains to be seen what proportion belong to the class of pioneers who have worn out the soil elsewhere. In all older settled countries an improved system of agriculture is adopted *per force* as it were, because without it the land would not sustain the increased population.

In a large proportion of Missouri, agriculture has been nearly or entirely prostrated during the war; buildings and fences demolished, and the inhabitants obliged to flee from their homes for safety. From that prostration we are now recovering with astonishing rapidity, under the benign influences of peace, and doubtless by the energy and enteprise inspired by the new *regime*. We have been undergoing the transition from a slave labor system to one of free labor. The effect upon many of our farmers has been discouragement and prostration. Having a large amount of property in slaves, which they have suddenly found to be *not property*, they have felt very much as a man does who has been robbed. Having all their lives long depended greatly upon slaves, and having lived comparatively "*free and easy*" lives, they have lacked the enterprise and mental resources which seem to be generated by the more energetic life of the free states, and which was so much needed to enable them to meet successfully the great change. Some instances of the kind referred to could but have been expected. Agriculture probably suffers little in consequence, rather gains ultimately, because such men sell or rent at the first opportunity to men of more enterprise. The great majority of our slaveholding farmers, however, it is believed, met the change in a different spirit—welcomed it, in fact, and gained by it. Not a few rejoiced at it. A new and lively interest has been manifest in agriculture; many of the old county societies have been revived and fairs held, and these social reunions of the farmers have been enjoyed with all the zest of former days.

Some of the evils and defects of the past it may be well to consider, because these evils must be rooted out in order to insure prosperity in the future. This subject we must present briefly, leaving the more important considerations of the kind to a future time, when an opportunity shall have been afforded for becoming better acquainted with the wants and necessities of agriculture in the State. The few remarks submitted should be received with due allowance for the circum-

stances, namely, that the work undertaken is new, and the means were not provided for visiting the various parts of the State to obtain the facts in regard to the condition of agriculture.

TOO LARGE FARMS.

First. Our farms are too large. This is one of the evils accompanying slavery. Slaveholders have evidently regarded it necessary to have large farms, in order to keep their increasing forces employed, and in case their old fields became exhausted, to turn their attention to new ones. In this respect they were undoubtedly right, for slavery is certainly incompatible with "improved agriculture," in the modern acceptation of this term. Improved agriculture requires the application of a degree of intelligence, even in the laborer, that has not been considered consistent with slavery. How often have improved implements been laid by for years, because there was not intelligence enough in the slaves to use them, and often not enough in the masters to put them together properly so that they would work? It is not pleasant to tell unwelcome truths, but it is better sometimes that they should be told.

As the country becomes older, and with the change in our labor system, if we would farm profitably we must farm well. There must be a radical change in the mode of culture hitherto generally practiced. We must avail ourselves, to a greater extent, of the advantages of labor-saving machinery. We must adopt such a system of thorough culture as will produce the best results with the least proportionate expenditure, and at the same time preserve and increase the fertility of our soils; and such a system is inconsistent with the too common practice of "skim culture" of a large number of acres.

A writer in the *Missouri Republican*, in treating of this subject recently, says:

"The superior advantages of cultivating small parcels of land well, over large quantities poorly taken care of, is patent to any one who has given the subject proper consideration, and it needs no new ideas upon the subject to prove it, but it should be impressed upon our farmers as often as possible, many of whom, brought up to work slaves, found them as much as they could attend to, and thought it necessary to have large quantities of land to keep them at work, and raise food to support them, and many, no doubt, who had good land and negroes, made money easy enough—but that day is past, and a quite different and better system will now have to be adopted to make farming profitable. I know it is not profitable to farm here in the same manner as in England, Lombardy or the Netherlands, in consequence of the difference in price of labor and amount of capital used; but a medium course should and must be pursued to make farming pay well in this State.

"Besides making clear what is this medium course, I have a few original ideas which I shall introduce—not theories hard to prove or

put in force, but plans that have been well tried, and that I am sure will pay our farmers well.

"The first thing, then, to consider is the quantity of land. This, of course, is to be regulated by the amount of help at your command, and I should lay it down for a rule that where a man calculates to do most of the work himself, with perhaps a little help haying and harvesting, forty acres is enough, and fifteen acres extra for every good hand he can employ. Less than this would be better than more. I would here remark and impress on St. Louis county farmers the absolute necessity of every farmer fencing in a pasture, well set in blue and herds grass or clover, at least two acres for each head of large stock (more particularly for cows), for good stock cannot be kept up or made profitable being let run in the road—neither can you expect plenty of milk or good butter without a cow gets good and regular feed without much traveling. Among the advantages of small farms, besides bringing land to a good state of cultivation, may be mentioned its certain effect in increasing the density of population, value of land, facilities of education, creating better society, small towns, reducing taxation, and in fact making the country better and more wealthy.

"I know many will think it almost ridiculous to speak to them about cultivating such "small patches"—men that have been used to having one or two hundred acres of land about half cultivated; about the same amount with nothing particular on it, and a few hundred in woods; but let them commence by selling half, and with the money purchase good stock, build substantial fences and plenty of outbuildings to store their crops and cattle, plant vineyards and orchards, and they will find great pleasure and profit in having plenty of good animals and produce to forward to market, and will find more satisfaction in knowing they have a large balance at the bankers than in owning the few hundred acres that separate them from their neighbors.

"These small farms are the secret of the beauty of the scenery of New York and other well cultivated States. What Missourian that has traveled through the Genessee valley but would wish to see such a well filled country in this State; yet we would have a better here if small farms be cultivated well, instead of the way land is mostly used in this country. If the advice I give in these papers and the hints so often brought before the public by the *Missouri Republican* be heeded, we will soon have the handsomest, as well as the most profitable section of country to be found in the United States.

"Besides what I have mentioned about the profit of this mode of farming, there is another light in which we may view the subject, and that is on the point of religion, the aim and end of which is to do right. No matter what creed we belong to, we must all agree on this. And, may I ask, is it right to take or keep land from those that need it and could and would cultivate it—keeping land idle that would yield something, and but half cultivating land and exhausting it—*is it* right to waste the bounties of Providence? It is true char-

ity to do good in everything, in farming and in the management of business, to make the greatest amount of good we can to the world. There is not much charity or religion in "skinning" large portions of land, and at your death leaving it worthless for many generations. But there is some in 'causing a blade of grass to grow.' There is more sin, perhaps, than farmers ever dream of in bad farming."

The "infatuation of much land" has not been peculiar to the slave States, although it may have existed there in a greater degree. It is a wide-spread evil. A correspondent of the *American Agriculturist*, some seven or eight years ago, wrote as follows:

"In my peregrinations through the land, in search of a farm, I find the passion for real estate, in the shape of more territory, is almost universal. It is about as strong in the Yankee with his three hundred acres, and two men, as in the planter with his five thousand acres and fifty negroes—each having at least five acres lying idle to one worked with any profit. The passion prevails not only among the dominant class in the rural districts, but may be said to pervade all classes. Multitudes in the city, who hardly get time to step in the country at all, own large estates there, and capitalists who never expect to work an acre of land, own whole townships. The motive of vanity also has something to do with this passion for land. A man may own bank stock or invest in note of hand, and make very little show of his wealth. But land has breadth of surface. It is a means of measuring personal importance by the acre, eagerly grasped by multitudes who have no other claim to the consideration of their fellows. Some buy for show, some for fear of future want, some for present security, while only a few purchase to subdue and cultivate. 'Only so much land as we can till and make better' is the motto for every farmer. All beyond this is a nuisance that calls for abatement."

The justice of the writer's remarks is everywhere perceptible. Farmers own too much land, cultivate too much land, and pay too little attention to improvement in cultivation. A few years ago it was not difficult to raise one hundred bushels of wheat from three acres of land. Now it can scarcely be done in the older settled localities from six acres. Consequently, the farmer generally increases the number of acres in cultivation in order to make up the deficiency in product. There is a downward tendency in this that should be arrested. The same amount of labor and capital, with more judicious cultivation, would produce as large results from at least one-third less land, and prevent deterioration of the soil.

The general complaint among the thousands who have recently been in the State to buy land, is that the farms offered for sale are too large. It is believed to be the true policy of our large landholders to sell off portions of their lands in small tracts, even at low rates, to thrifty farmers, who will improve them, thereby increasing the value of the remainder. We think it the duty of many of our farmers, to themselves and to the State, to sell off portions of their large estates.

They will thus benefit the State, by aiding to populate it with industrious and thrifty citizens. They will benefit themselves, by the increased prosperity they will bring around them, and by having more means to employ in improving more thoroughly their smaller farms.

DEEP PLOWING.

Second. Our culture is almost invariably too shallow. This is one of the natural evils of cultivating too much land. Farmers generally do not plow as deeply as they suppose. They will find by measuring accurately on the land side, that four inches will appear to be quite a deep furrow. When land is plowed only two or three inches deep, as stated in some county reports, if the land is rolling and the subsoil compact, the rains will soon wash what little loose soil there is off into the stream, and by the time such land is fairly subdued it will be nearly worn out; whereas, if the land is deeply tilled, it will absorb the water and gain in fertilizing materials which are brought down from the atmosphere by the rains.

About a dozen years ago, by the influence of Professor Swallow, formerly State Geologist, a few farmers in Boone county were induced to try sub-soil plowing. Major Rollins, who plowed from fourteen to sixteen inches deep, reported as follows: "The increase of each crop, I should estimate, amounted to twenty-five per cent.," and "the increased profit of cultivation by the system of deep plowing at from twenty to thirty per cent."

Eli E. Bass, Esq., who sub-soiled his land, says his "crops were doubled, and the profits doubled" by this system of cultivation.

Professor Swallow says that "several fields thus sub-soiled did not even wilt beneath the unprecedented drouth of that season, while those adjoining were badly burned."

Yet, in the county report from Boone this year, it is stated that sub-soil plowing has been tried in only a few instances. Will the farmers of Boone admit that sub-soil plowing has been tried in that county and proved a failure? We apprehend not. But we must admit that farmers are sometimes the slowest persons in the world to learn. And if a farmer happens to have the good fortune to have been born in Old Virginia, he is generally the slowest of all farmers in adopting "new fangled notions."

UNDER-DRAINING.

Good farming consists chiefly in deep plowing, under-draining and manuring. Missouri farming is greatly deficient in all these respects. Under-draining is not necessary for all soils, neither will it be expedient at present, probably, to under-drain some soils that do need it, situated at a distance from market, where labor is scarce, and where there is an abundance of new unbroken soil at low prices. But the time has come when it will pay to under-drain our retentive

soils, which have been longest in cultivation and command a high price, near large markets. Let Old Virginians laugh as they please about "tubing the land;" it is being tried, and will win its way into favor. A tile factory has been established in St. Louis during the present year, for supplying the demand, which has heretofore been supplied from the East.

The advantages of under-draining have been summed up in a few words, as follows:

1. It removes stagnant waters from the surface.
2. Removes surplus water from under the surface.
3. Lengthens the seasons.
4. Deepens the soil.
5. Warms the under soil.
6. Equalizes the temperature of the soil during the season of growth.
7. Carries down soluble substances to the roots of plants.
8. Prevents "freezing out," or "heaving out."
9. Prevents injury from drouth.
10. Improves the quality and quantity of crops.
11. Increases the effect of manures.
12. Prevents rust in wheat and rot in potatoes.

MANURING.

In regard to manuring, our farmers, to a great extent, are blind to their interest. They annually send the products of their fields to market, returning nothing to the soil, without seeming to be aware that they are thus annually disposing of their "capital in trade." If it is the deliberate intention of a farmer to exhaust his soil, sell out and buy new, such a course is consistent. But if it is his intention to make a permanent home for himself and his children, then it is much better economy to keep up the fertility of his land than to wait till it is exhausted, and suffer the expense and difficulties of renewing it. The best land in the world can be exhausted unless it is so situated as to be subject to overflow. The fertility of almost any land may be maintained, even without barn-yard manure or the manures of commerce, by means of deep tillage, rotation of crops, and occasionally plowing in a crop of clover or other green crop. But all the manure of the barn-yard and the house should be carefully saved and properly distributed upon the soil, instead of being wasted, as it too generally is.

Nature's laws are nicely balanced, and as inexorable as wise. The carbonic acid exhaled from the lungs of animals is absorbed by the leaves of plants, while the leaves give off oxygen, without a supply of which animals could not live. Thus, an equilibrium is maintained in the atmosphere, essential to the health and life of both plants and animals. Again: vegetation contributes the chief food of the animal

kingdom, while the excrements and decay of animals returned to the soil, together with decaying vegetation, affords precisely the necessary nutriment for sustaining vegetable production.

But if, as is the case with us, the products of the soil are annually shipped to the great city to sustain the immense amount of animal life congregated there, and the debris, excrement, and decaying matter of the city is not returned to the soil which needs it, it follows that the soil must be liable in time to become impoverished, while the filth of the city remains to poison the inhabitants, and plague and pestilence follow, to diminish the number of a population willfully ignorant or stubbornly neglectful of the laws of conservation. Agricultural intelligence should contribute to the health, wealth and moralty of the whole community.

SELECTION OF SEEDS.

Too little attention has generally been paid to improvement in seed and the selection of the most perfect seed for reproduction. There is in this respect an interesting field for the exercise of much skill and judgment and for experiment, to determine many debatable or unsettled questions.

Certain soils are much better adapted to the perfect development of certain crops than others. Highly stimulating manures may produce an excessive growth of stalk or foliage, sometimes at the expense of the vitality and vigor of the seed. Overgrown vegetables are perhaps generally not the best for seed. The seed of very large squashes have been found to produce, year after year, smaller and smaller specimens. It is now generally admitted that medium sized potatoes are the best for seed.

Some seeds are improved by age; to what extent this may be the case, is not determined. It is admitted that seeds of the cucumber, squash, pumpkin and melon are improved by age up to about six years. It is important to prevent the hybridization of these varieties, and when a crop has been produced under such circumstances as to prevent the liability of mixing, a supply of seed sufficient to last a half dozen years should be safely stored away.

Tobacco seed which has been kept for a long time, has been thought to be very prolific, but rather defective in foliage. The same fact has been noticed in connection with some kinds of grain which had been laid aside and forgotten for a long time, and afterwards used for seed.

The introduction of foreign varieties of the potato, and the production of new varieties by hybridization, to take the place of old, diseased and degenerated varieties, has been of vast benefit. The late Rev. C. E. Goodrich, of Utica, New York, devoted a large portion of his life to the improvement of the potato, and the whole community is largely indebted to him for the valuable improvements he has made. The New York State Agricultural Society, in 1863, by resolution, awarded to him one hundred dollars for his valuable investiga-

tion and experience in the propagation of the potato, and at one time subsequently, a subscription was taken up for his benefit, amounting to seven hundred dollars. A few of his seedlings have been introduced and cultivated in the West with good results.

The Early Goodrich, Gleason, Garnet, Chili, Pink Eye, Rustycoat, and perhaps some others, have proved highly satisfactory, and their more general introduction and trial, as well as others of the Goodrich seedlings, would no doubt result in great improvement.

A serious defect among farmers everywhere may be here incidentally referred to. There is an almost endless diversity of opinion and practice among farmers in regard to the cultivation of the potato—whether the seed should be cut, how much seed should be used, how it should be planted, how cultivated, etc., etc., showing a great want among farmers of habits of close observation, and a correct record of facts and results. It would seem that something more definite should by this time have been settled upon in regard to a crop which has been cultivated for centuries.

It is a fact that very little attention is paid, in Missouri, to the selection of seed corn—this crop being the most extensively cultivated perhaps of any other. A late number of the *Rural World* says:

"It is the practice of many of our Western farmers to gather their corn during the fall and winter, and place it in their cribs, and make no selection of their seed corn until time for planting in the spring arrives, and then the best looking ears are culled from the crib.

"The same laws apply, and with equal force, in the vegetable kingdom, that do in the animal, viz: that like begets like. Very large prices are paid by breeders of cattle and horses for choice, thrifty and faultless animals to breed from. Compare the offspring of these with those from the common, or scrub animals of the country, and mark the difference. One will attain, in a given time, to the weight of five hundred pounds; the other, in the same time and with the same feed, will hardly weigh half as much. Equal advantages are gained by the selection of seeds from strong, thrifty, prolific plants. Seed corn should always be selected in the field, where the strength and vigor of the plant may be seen, and none but the fairest ears should be chosen, and these from the most productive stalks.

"We have fully proved the advantage of selecting seed in this way, not only in corn, but in many other varieties of vegetables. The labor is no greater in making the selection at this time than it is in selecting it in the crib."

An old rule for selecting seed corn was to take the largest and best developed ear from stalks producing two or more ears. Some facts have occurred which indicate that this is an unsafe rule. A committee of the Massachusetts Board of Agriculture, while investigating another subject, were struck with the unusual thriftiness of a field of corn, owned by one of the best farmers in the locality, and noticed the unusual number of twin ears. The question was asked how this result

was produced. The answer was, "It results from the fact that no twin ears are ever saved for seed, my experience having convinced me that my corn deteriorates rapidly while I follow the old rule, and it has improved with equal rapidity, both in quantity and quality of the crop, since I adopted the plan of selecting my seed from stalks bearing but a single ear."

Another rule also prevailed, to reject for planting the kernels upon the two ends of the ear. Experiments were made to test this practice on the State farm of Massachusetts. The result, in connection with experiments made elsewhere, was to establish the fact that the apparently undeveloped kernels on the tip of the ear gave the greatest weight of grain to the acre.

There is no doubt of the propriety of selecting for seed the best developed ears from the best stalks as soon as the crop is ready for gathering, and carefully preserving them free from any influences that can impair their vitality, and it will be quite safe to use the whole of ears so selected for seed.

It is said that oats, with ordinary culture, rarely produce more than twenty-five fold; if sown in drills, properly thinned and cultivated, they not unfrequently produce a thousand fold, and any sensible man would prefer for seed grain produced by such culture. Thorough culture is very important to the growth and perfect development of plants. It destroys noxious weeds that rob the plant of a portion of nutriment. To some extent it prevents blasts and vegetable diseases. Then, why not adopt drill sowing, thinning out and hoeing, to an extent sufficient to raise our seed wheat, oats, barley, etc.? It would be rather expensive when labor is high, but it is a question whether in many cases it would not pay.

Some experiments have been made to improve wheat by careful selection and cultivation, which seem to show that there may be as much importance attached to the pedigree of grain, in some instances, as there is to the pedigree of stock.

A communication from a farmer of Chester county, Pennsylvania, giving a description and history of Hallett's pedigree wheat, was published in the *Rural Advertiser*, of Philadelphia, last May and June. Believing it to be of sufficient interest and importance, it is here given entire.

THE IMPROVEMENT OF OUR CEREALS, AS ILLUSTRATED BY HALLETT'S PEDIGREE WHEAT.

Most, if not all of the readers of the *Rural Advertiser*, have heard of this new species of wheat, and many of them have no doubt noticed the engravings of its enormous heads as they have been represented in some of our agricultural journals; and perhaps not a few of the latter number have set them down as exaggerated representations of an *extra* fine ear. To such as have not investigated into its history and "pedigree," this is a very reasonable conclusion, and takes posses-

sion of the American farmer's mind all the more readily because the "breeder" of the wheat happens to have been born and raised on the wrong side of the ocean. Even if the mother country did, in 1776, claim the right to oversee the domestic concerns of her newly married daughter, and again, in 1812, did undertake to investigate into the internal economy of our merchant ships, it is or should be no reason for discarding all the good ideas which we may learn from our transatlantic cousins.

Up to the year 1856, Frederick F. Hallett, of the Manor House, Brighton, England, had attained quite an enviable notoriety as a breeder of improved Short Horns, and still keeps up a very fine herd. In 1857, after a careful observation of the crops of the preceding year, and a careful study of Darwin's Natural Selection, he became convinced of the truth of what he states to be the two laws upon which hang the rules governing his improvement of wheat: 1st. In every plant of wheat, barley or oats there is always one best ear, and in every ear there is always one best grain, which is that one found at the following harvest to produce the best plant, all the other grains having been planted in competition with each other.

Hallett claims this as his great fundamental rule, and the only one which governs his actions, which he claims as an original idea; the others he considers to be merely the carrying out of ideas already put forth. His second rule is plain, and, to a certain extent, is forcing its way into the practice of our farmers, as is proved by the gradual but steady increase of drill culture over broadcast and hill culture; it is that the "full development of the ears of a wheat plant can take place only where its roots are perfectly unimpeded in their growth; this requires that the grain should be planted singly, with a considerable space appropriate to each, and with sufficient time afforded for its growth so as to occupy that space."

If these conditions are fulfilled, we obtain from a single parent grain as many ears as are usually obtained from twenty grains, with this important advantage, that these ears being produced from plants which have attained perfect development of their growth, contain more than double the common number of grains.

So much for Hallett's theory, or, rather, rules. Let us see whether his practice will stand as rigid an examination as will his rules above given. First, remember that his task was one of no small magnitude—he had adopted the theory of pedigree in wheat as parallel to that already indorsed in animals, but, unlike the breeders of the latter, he had no noted herd to draw from. His first task was to select from among over fifty varieties that which would yield the largest per centage of fine flour, and consequently the least of bran; as best fulfilling this requirement, he selected what was known as nursery wheat, of which he took two ears which came the nearest to what, according to his ideas, an ear of wheat should be. One of these ears contained forty-seven grains and the other forty; the first was four and three-

eighths inches long and the latter four. I have before me a copy of a photograph of this ear, and find it to be large when compared with the ears of one of our average crops, but small when laid side by side with copies of the photographs of some of its more illustrious followers. The grains from each of these ears were carefully and separately dibbled in in squares of one foot; this, according to Hallett's writing, was on twelfth month, 17th, 1857. The best grain of the best ear produced ten ears, containing a total of six hundred and eighty-eight grains; the best ear contained seventy-nine grains, and was taken for a next trial and planted as before on tenth month, 22d, 1858. The best grain produced seventeen ripe ears and five green ones, containing one thousand one hundred and ninety grains; the best ear contained ninety-one grains, and was planted in the same manner as before, on ninth month, 19th, 1859. The best grain produced thirty-nine ears, containing in all two thousand one hundred and forty-five grains; the other one thousand one hundred and eighty-nine grains produced one and three-quarter bushels on six hundred and ninety-eight square feet of space. The best ear (owing to the bad season of 1860) produced but seventy-four grains, which were planted tenth month, 4th, 1860, and produced from the best grain fifty-two ears, the best ear of which contained one hundred and twenty-three grains, and was selected as a new starting point, and planted ninth month, 19th, 1861, where its best grain produced eighty ears. The best ear of 1861 contained, as before stated, one hundred and twenty-three grains, and was eight and three-fourths inches long.

As I have now before me a copy of a photograph of the best ear of 1861, a short description of it may not be uninteresting to the readers of the *Rural Advertiser*.

All who have examined an ear of common wheat have noticed that it is composed of two distinct divisions of grains, extending throughout the whole extent of the ear from base to point; and further, that in a common crop the grains of each division are arranged in two parallel rows running from the base to the summit of the ear. In an extra crop we find an extra row starting at the base of each division, and running out nearer or further from the base, according to the increase of the crop. For the sake of brevity, I will style the divisions sides, and, as the two rows are arranged in pairs of grains, I will style each pair a "chest." Now, let us remember that a common grain of wheat will have from five to ten of these chests, which never, in my observation, have contained more than three grains each, and this never further than the sixth "chest" from the base, but much oftener contains but two grains; it requires a pretty good ear of our common wheat to contain twenty-five grains, which I think is above the average of most of our best fields.

The head of Hallett's wheat, which we have under consideration, exhibits fifteen of these chests on one side and fourteen on the other. Commencing at the base of the ear, the grains lay in the chests as

follows, (the position of the chest on the ear may be readily obtained by counting): four, five, six, six, five, five, five, five, four, four, four, four, three, two and one, which, added up, make sixty-three grains for this side of the ear; the other side has but sixty for its chests, commencing alternately with the others, and of course it has one less. From this we see that the two best chests are the third and fourth.

This much for Hallett's experimental plot. Let us now consider his field culture, for all this time he has not been entirely occupied with his half acre lot, but has been cultivating wheat in the field by score of acres. The question which then arises is, from whence does he get the seed for his fields? In answer to this question, Hallett writes: "From one grain planted in September, 1859, I drilled in September, 1861, forty acres; a whole ear in 1859 would have drilled eighty times as much."

In consideration of this point, it may be well for us to pay some attention to his mode of putting in the crop, and the amount of seed required by his system for a given space. His argument is (and our own experience proves it to be as true here as there), that the amount of seed should vary with the time of sowing—that is, that the later the wheat is put in, the more seed it will require for a given space.

Hallett earnestly recommends all who try his seed to try at least a portion of it on his plan, viz.: but a single grain in a place, if possible, and, if planted in the eighth month, nine inches by nine; ninth month, nine inches by six; tenth month, nine inches by four; and for general field culture, in the following proportions:

Ninth month, at the rate of four bushels in ten acres.

First half of tenth month, at the rate of four bushels in eight acres.

Second half of tenth month, at the rate of four bushels in six acres.

Eleventh month, at the rate of four bushels in four acres.

Twelfth month, at the rate of four bushels in three acres.

Second and third month, at the rate of four bushels in two and a half acres.

"Thin seeding again," says our practical farmer; but, if thick enough, what difference? My own field was drilled in at the rate of three pecks on one side, gradually increasing to one and a half bushels on the other, and I defy the best eyes to detect any difference; but as Hallett states, it must be done early. If our farmers object to this advice, which he gives to others who purchased his wheat, what will they say to what he practices in his own fields, when he states over his own signature that his rule for home field cultivation is one bushel on six acres, if planted in the eighth month, and the same amount on four, if planted one month later. He uses the same drill for wheat as he uses for sowing turnip seed, and which puts in twelve rows of wheat.

With regard to its yield per acre under field culture, Hallett writes as follows: "Notwithstanding the generally bad season of 1862, several reports have been received of crops of the 'Pedigree Nursery

Wheat,' of sixty bushels per acre. One gentleman in Yorkshire (English, yet) grew, in 1862, upwards of sixty bushels per acre, and in 1861 sixty bushels per acre, from less than one bushel of seed per acre."

"From near Perth, Western Australia, the following report has just been received: 'The English wheat, (Hallett's) sown before I came, produced, when drilled, twenty-nine bushels per acre; when dibbled, thirty-five bushels per acre. The average crops here are under ten; ours were six, and our neighbors' opposite four and one-half bushels. The largest ear produced one hundred and thirteen grains; the greatest number of ears from one stool (or grain) was seventy-two.'"

I make the following extract from a speech made by Lord Palmerston at an agricultural meeting, held at Romsey, (the italics are mine): "We have seen a statement made—and *I* have seen an example of it—that a gentleman at Brighton has made a wonderful improvement in the growth of wheat. By carefully selecting his seed, and by dibbling those seeds so as to give room for each plant to grow, he produces wheat ears infinitely larger than those of the common plant, and the stalk is considerably stronger. *I saw not long ago*, in Derbyshire, a field of wheat which was so grown, and I was astonished at the produce which it yielded," etc., etc.

For those who dislike English authority, I will make the following extract from *Judd's American Agriculturist*, of the 9th month, 1861: "There is no denying the fact, that Mr. Hallett is producing extraordinary results in his experiments with wheat. *We have seen with our own eyes* some of those results, and can bear witness that the large engravings of wheat heads we published last year are even less in size than those we saw and measured the present year."

The question now undecided is, will this suit our climate? This question we cannot yet answer, but hope to be able to do so in due time, as I have a bushel for sowing the coming fall. It was received direct from Hallett himself, but came too late (twelfth month, 1st) for use last fall, but late as it was, I put a small portion in one grain in a place six inches square; it is now well up, not a grain having missed. The best stool contains twelve stalks. Hallett's directions, which did not come to hand for some time afterwards, were, to put it in six inches by three, and had it been so put in it would have been quite as thick as our common wheat.

But whether this wheat can be acclimated or not, its lesson should not be lost, for our own wheat is capable of the same or similar improvement, as has, to a certain extent, been proved by thy friend,

E.

IMPROVEMENT OF STOCK.

In regard to the live stock of Missouri, there is certainly great need of improvement. We venture to say that the great majority of it is of the most common and unprofitable character, and is too generally

bred without the least regard to improvement. It is true, that there has been no opportunity for such improvement during the war; but now, that the war is over, attention should be turned in this direction more than heretofore. Comparatively few farmers, who might have done so, have provided pastures for their stock, but the majority of it has been allowed and expected to find a living by a free range in the woods, roadsides and unoccupied prairies. Any scrub animal, which, from sheer neglect, and, perhaps, on account of his inferior qualities, is allowed to grow up free of castration, is permitted to propagate his bad qualities without hindrance. If the farmer needs money, or has more stock than he desires to keep, he too often sells off the best animals, because they are salable at better prices, and keeps the worst because they are unsalable. There is, then, a constant downward tendency. No man can possibly think, if he thinks at all, to make stock growing prosperous by such a system.

In the breeding and management of horses and mules, much more intelligence and interest is manifest, and in this respect Missouri probably compares favorably with most of the other Western States.

In many localities, excellent breeds of hogs have been introduced, and found profitable when well cared for. The Chester White is the general favorite, the Suffolk less so. The Berkshire has met with a fair degree of favor. The Essex, I think, has not been sufficiently tested. The Yorkshires have not been introduced, that I am aware of. For those who want a large breed, and are willing to take good care of them, the Yorkshire would be very desirable.

Probably the great majority of hogs that are fattened on corn in this State eat more in value of that staple than the pork is worth when it is made. If our farmers would take the trouble to satisfy themselves, by experiment, as to how many pounds of pork a bushel of corn will make, there is no doubt it would be found in many instances that they are sinking money every year by feeding corn to their stock of *landpikes*. In this respect, as well as in many others, farmers are too careless about knowing whether their operations are really profitable or not.

D. A. Lillie, Kane county, Illinois, in a recent number of the *Prairie Farmer*, says: "A series of carefully conducted experiments have established the following rule upon this subject: A bushel of good raw, unground dry corn, fed to a middling good breed, in comfortable quarters, without much sun, and not allowed to root, and before cold weather, will produce ten pounds of pork, and if the breed is very good, fifteen. The same amount of fermented corn meal, one-half more, and if cooked also, three-fourths more than the first named—hence it is easy to find how much pork should bring to correspond with the price of corn. Take, for instance, raw corn, the most common way it is fed; pork at five cents a pound is equal to corn at fifty cents a bushel, and so on, above or below, in the same ratio. The

good of our farms and pockets demands that we sell our oats and corn in beef, mutton, pork, butter, cheese and wool."

Others have estimated from six to eight pounds of pork from a bushel of corn. Comparatively little corn, if fed under all the favorable circumstances mentioned by Mr. Lillie, and it is highly probable that the yield obtained is much oftener under eight pounds per bushel than over. Those who have an eye to improvement should note the difference in the yield between "middling good" and "very good" breeds, as well as the remarkable difference between the results of raw, unground corn and corn meal fermented or cooked. It is a great mistake, wherever it can be economically avoided, to feed corn raw and unground to stock of any kind. Animals will not masticate it all, and every farmer knows that many grains are passed through whole. Besides the positive waste thus occurring, the passage of these whole grains through the intestines proves a source of irritation and disease, doing a damage and no good.

Every farmer in circumstances to allow it, should have upon his farm a suitable power, either horse or steam, which will thresh his grain, cut his straw, shell his corn and grind it, or grind it without shelling, saw his wood, etc. It is difficult to carry on his business economically without it. In addition to this, if he fattens many hogs, he should have an arrangement to cook their food.

In new countries farmers must depend very largely upon outside "range" for their stock, but even then a good quality of stock will pay much better than bad, and much more care might be taken if a little more interest was felt in the subject to keep up and improve the quality of such stock. Just as soon as a farmer can arrange to keep all his stock on his own land, he will find it much more profitable to do so. He will then not be liable to loss by straying, he will always know where to find his animals, the manure will always be dropped where he will reap the benefit in future crops, and he can control the breeding and management of his stock so as to secure such improvement as he desires.

In many, perhaps most, portions of Missouri the Short Horns, more commonly called here Durhams, have been introduced, and the fine grades of this breed almost every where seen show that a very great improvement has been effected thereby. There are many very fine pure bred Durhams in the State, and for the purposes of beef and work they are admirably adapted to the luxuriant soils of our river bottoms and prairies. Some families of the Short Horns are good milkers, that is, they give a large quantity of milk, but it is seldom rich. The grades of this breed are generally much better milkers than the pure stock.

THE DEVON CATTLE.

The Devons are much less known in this State than the Short Horns. For a large proportion of Missouri, particularly for our tim-

bered hill lands, where pasturage is generally less luxuriant than in the bottoms and prairies, the smaller sized, compact and active Devon is much the best adapted. They will thrive on much less feed than the Durhams; they mature early, and the oxen are quick, active and kind. They are not noted as large milkers, but the milk is rich. They should be much more generally known and introduced.

Mr. C. D. Bent, of Iowa City, Iowa, is an enthusiastic breeder of Devon cattle. He has exhibited several animals from his herd at the St. Louis fairs, and several have been purchased by citizens of this State, and have proved highly satisfactory. In the *Iowa Agricultural Report* for 1863, Mr. Bent says:

"PECULIARITIES OF THE DEVONS. There are some peculiarities noticeable in the Devon cattle that others do not possess. Among the most prominent is the color. White or black seems to have been common among those ancient races, but where these were found the memory of the red prevails. It seems the people of Scotland and Wales had a superstitious reverence attached to it in the tradition of the countries. The milk of the red cow was considered a remedy for every disease and a preventive from every evil, so that this color was most scrupulously adhered to by the Devon breeders; and it seems in this way, if no other, the color has been established and perpetuated. The deep red color of the pure bred Devon is so strongly implanted that it can be traced many generations, when crossed in with other breeds; for there is no other race so free from foreign intermixture, which gives to them their character. Although the color of the pure Devon varies somewhat in its shades, still each individual retains the same shade entire, without any perceivable variation. A blood red is preferable; the very dark, being less thrifty, and generally hard handlers; while the very light red, with a thin papery skin, are less hardy in a cold climate. They invariably have a light orange-colored ring encircling the eye. The inside of the ear and the nose the same color. The latter should be free from dark color or spots. The brush of the tail is invariably white after a year old. The comparative smallness of the cow is another prominent characteristic of the breed. The bull is larger than the cow, and the ox much larger than the bull. Early maturity is a very noticeable peculiarity in the Devons. In the vicinity of New York City the grade Devon calves are much sought after for veal; even the half-blood (when I was there in 1854) would bring two cents per pound live weight more than any other, on account of their ripeness, as they term it. Persons unaccustomed to seeing them are often deceived in taking a two year old for a full grown cow, which they so much resemble. In fact, an eight months old heifer is a miniature cow. I have seen them produce calves at fifteen months old, and both do well; but, notwithstanding their ripeness, they do not arrive at perfection until about six years old, and when matured they attain to unaccountable old age. I once butchered a Devon cow, (grass fed only) which netted between seven

and eight hundred pounds, that only lacked a few months of being twenty-three years old, she having bred regularly up to twenty-one years old; and Megunticook, (251) who will be eighteen years old in April next, not long since, to all appearances, was as good for use as ever.

"The Devons are justly celebrated for the richness of the milk. I have seen it stated that four quarts of their milk have produced a pound of butter. They are not excelled nor equaled by any other breed, except the Alderney, which, according to Youatt, is very inferior in quantity, while most of the Devons produce over an average quantity, and many of them a very large quantity.

"QUALITY. I believe it to be a conceded fact that the Devon ox cannot be excelled as a worker. Youatt says, 'at the plow they have a quickness of action that no other breed can equal, and very few horses excel. They have a docility and goodness of temper, a stoutness and honesty of work, to which many horses cannot pretend. Four Devon steers in England are considered equal to three horses in the field or on the road, and do often perform the same work in less time. During harvest and in catching weather, they are sometimes trotted along with the empty wagon at the rate of six miles an hour, a degree of speed which no other ox but the Devon has been able to stand. They are seldom shod and rarely lame,' owing to the perfection of their feet, and the sloping position of the shoulder, which prevents concussion and facilitates their action.

"The milking qualities of the Devons are generally good. They have been overlooked by some, in their anxiety to obtain a beef animal; while by others their milking qualities have been improved. Mr. Bloomfield, the manager of the estate of the late Earl of Leicester, England, has, by careful attention, greatly improved the size and quality of the Devons, and increased their milking properties, so that he obtained a prize for having produced an average annual yield of two hundred pounds of butter per cow, in a dairy of twenty cows, or equal to four pounds of butter per week, the year round. He offered to milk forty pure Devons from his herd against an equal number of cows in any one heard of any breed found in England, without finding a competitor. For farther proofs of their milking qualities, I will refer to individuals of different herds:

"Beauty, (533) bred by Mr. Hurlbut, produced sixteen pounds of butter per week, in June, 1850.

"Helena, (774) imported by Wainwright, gave as high as twenty-two quarts of milk per day, and made fifteen pounds of butter per week. Old May Flower, the granddam of imported May Boy, (71) made over seventeen pounds of butter per week. Flora 2d, (120) by Eclipse, (191) imported from the herd of Bloomfield, bred by H. Capron, now owned by myself, has made twenty-one pounds of butter in nine days. Mr. Coleman says, in his European Agriculture, 'the most productive cow in butter which I have found, was a North Devon, which, for several weeks in succession, without extra feed, produced

twenty-one pounds of butter per week. The character of the owner places the fact beyond a doubt.'

"The Devon cattle for beef are highly esteemed in England, as well as in the city of New York. I heard an experienced butcher of the latter place say that the best dressed beef he ever saw was a Devon steer. He stated that where the quarters were separated between the ribs it was from three to four inches thick, of as beautifully marbled meat as though the fat and lean had been mixed and chopped together. At the Smithfield show of fat cattle, held at the London market place in 1858, the gold medal for the best ox or steer in the show yard of any breed, was awarded to a Devon, bred and owned by the Earl of Leicester. They are highly esteemed in the Smithfield market, not only for the excellence of the meat, but for its proportionable size. In weight the Devon is much excelled, but the opinion of the Devon breeder is, that more meat can be made with a given amount of food from them than from any other breed. The quality of the Devon beef is unsurpassed, even rivaling the little black West Highland ox in the estimation of the London West End butcher, whose fastidious customers oblige him to kill none but beef of the finest quality and flavor.

"Their adaptation to this climate and latitude is complete. The Devons are hardy, active race, covered with a thick fine coat of hair, which protects them from the severe storms of winter. Their energy and perseverance, with a disposition to hunt their living, makes them well adapted to the rough usage of winter pasture, as it is termed, or ranging in the stalk field, and while so doing, and while ranging upon the prairie, they are found to thrive faster and do much better than the other cattle upon the same range. They are also well adapted to this country as breaking and emigrant teams, on account of their good action and great endurance. Their adaptation to the extremes of this climate to which we are subject, both of heat and cold, is remarkable, as well as to the extremes of latitude, both North and South, where they have been tested and given perfect satisfaction, while the Short Horns and some other breeds are only adapted to a medium climate. We do not claim that they will make the largest growth in a given time, regardless of expense, but they will make as much, or perhaps more meat, of a better quality, from a given amount of food, than any other breed on record, while their excellence in the yoke is unparalleled, and their milking qualities are seldom if ever excelled. We must class them with the horse of all work, and, taking them for all purposes for which cattle are used, the Devon must far excel any other breed in existence.

"Youatt says, 'the North of Devon has long been celebrated for a breed of cattle beautiful in the highest degree, in activity, at work, and aptitude to fatten stand unrivalled, and to take them all in all, they would suffer from an intermixture with any other breed.'

"Written for the State Agricultural Society's Transactions, by

C. D. BENT.

POINTS OF EXCELLENCE IN A DEVON COW.

PURITY OF BLOOD INDISPENSABLE.

POINTS.

ARTICLE 1. *Head* should be lean and bony; forehead wide and somewhat dishing between the eyes; face straight, but not long 2

ART. 2. *Nose*, of light orange color; a black or mottled nose should be rejected 3

ART. 3. *Eye* should be bright, prominent and clear, surrounded by a bright orange-colored ring 3

ART. 4. *Ear*, thin, rather below medium size, orange color within, with a quick movement, expressive of attention 2

ART. 5. *Horns*, light, tapering, of a waxy color, somewhat long, and spreading gaily towards the tips 2

ART. 6. *Neck*, clean in the throat, fine at the junction with the head and full at the shoulder 2

ART. 7. *Chest*, deep and round, carrying its fullness well back of the elbows, thus affording abundant internal room for the action of the heart and lungs 6

ART. 8. *Brisket*, full and round, spreading the fore legs well at the junction with the body; not projecting, but forming a regular slant, without dewlap to the throat 4

ART. 9. *Shoulder*, in this breed, is a beautiful and important point, and should, in a degree, approximate to that of a horse, with points less prominent and in a more sloping position than in most other breeds, indicative of activity and of good traveling quality 5

ART. 10. *Crops*, full and even, forming a line with the shoulder and back, extending well down the shoulder blade so as to prevent a cavity between the shoulder and the barrel 5

ART. 11. *Back*, full, loin broad, with the short bones extending full to the hoop ribs; hip bones wide and on a level with the sacrum, and setting on of the tail 8

ART. 12. *Rumps*, broad, full and well covered 3

ART. 13. *Escutcheon*, this should be broad, maintaining an even breadth from the udder to the sacrum 8

ART. 14. *Quarters*, long and well filled between the hip bones and the rumps, with a gradual taper, not showing the round bone, but a well turned finish, with a good muscular development at a regular slant to the hocks 6

A pork ham objectionable.

ART. 15. *Flanks*, moderately deep, full and mellow in proportion to condition 4

ART. 16. *Legs*, fore legs of medium length, spread wide at the brisket, straight, with well developed, round, muscular arm, firmly knit at the knee, fine shank bone with large sinews, drawing

POINTS.

nearer together as they approach the feet; hind legs with a gradual taper from the patella to the gambrel joint, which should be wide, leg below fine and flat, with large sinews, forming an angle of thirty-three degrees, and moving in a straight line with the fore legs..... 5

Crooked knees or gambrels, causing an outward projection of the feet, deduct 3.

ART. 17. *Tail*, set on full and broad, at a level with the back, small in the cord, and finishing with a tassel of white hair..... 2

ART. 18. *Carcass or Barrel*, round and straight, its posterior ribs springing nearly horizontal from the vertebra, with less curve as they approach the posterier plates, with full and well developed anterior plates covering deep the springing rib..... 4

ART. 19. *Color*, always red, but of different shades. A medium red should be preferred, the very dark red coming slower to maturity, their beef of poorer quality, of less weight, and inferior milking qualities; the light red less hardy, but claim earlier maturity and superior beef qualities. Some white about the udder is common to all the various shades, but confined to that part alone. In all cases the color grows lighter about the muzzle, while a color, verging almost to a black, and growing yet darker about the head, always was very objectionable for the true North Devon, and when accompanied by a dark nose should be rejected..... 2

ART. 20. *Hair*, should be short, thick and fine, even throughout the body, and short about the head; a long, coarse foretop, accompanied by harsh, wiry hair elsewhere, objectionable..... 2

ART. 21. *Udder*, should be wide and well spread, projecting well forward and back, wide between the teats, but not hanging; with milk veins large and extending well forward 9

ART. 22. *Carriage*. The Devon having, from their excellence in the yoke, another destiny besides that of the butcher's block, it is important that the animal's carriage should indicate as much; to obtain this, something of the heavy, inert, squarely molded frame of the merely beefing animal must be relinquished for a lighter and more active frame..... 3

ART. 23. *Quality*. To combine this with the other highly important and characteristic properties of the Devon, requires no small skill, observation and care in the breeder. For without this, in the eye of the experienced grazier and butcher, the animal is considered nearly worthless. No beauty of form can compensate for a hard, stiff feature, unyielding to the touch. The skin should have, when pressed between the thumb and finger, a mellow yet substantial feel, and when beneath the outspread hand it should move easily with it, back and forth, as though resting on a soft, elastic, cellular substance, which becomes firmer as the animal ripens, forming a beautiful marbled beef, which is highly esteemed in the London market..... 10

A thin, papery skin, is objectionable in a cold climate.

Perfection 100

POINTS OF EXCELLENCE IN A NORTH DEVON BULL.

Purity of blood indispensable, and traced back satisfactorily to importations of both sire and dam from known English breeders, or as found in the lately established herd book for North Devons.

	POINTS.
ARTICLE 1. *Head*, should be rather elevated above the back, short, broad and dishing between the eyes, with full, firm frontal bone over them; muzzle fine, with nostrils full and open.....	4
ART. 2. *Nose*, of a light, delicate orange color.....	5
ART. 3. *Eye*, should be bright, prominent and clear, but gentle in expression, as indicative of that spirited docility so necessary to cattle that must bear the yoke; a beautiful orange-colored ring should invariably surround the eye.....	4
ART. 4. *Ear*, thin, rather below medium size, of a rich orange color within, with a quick, ready movement, expressive of attention	2
ART. 5. *Horns*, light, tapering and round; gaily as well as symmetrically placed on the head, with an upward form.....	2
ART. 6. *Neck*, set on fine at the head, gently rising from the shoulders, full and muscular, an indication of strength and constitution; the gullet clean and free from dewlap, full at its junction with the shoulder.....	5
ART. 7. *Chest*, deep and round, carrying its fullness well back of the elbows, thus affording abundant room for the full and free action of the heart and lungs, without extreme width forward, or protuberance of the shoulder points.....	12
ART. 8. *Brisket*, full and oval, setting the arms wide apart at their junction with the body, indicative of a good feeling quality.	4
ART. 9. *Shoulder*, should take a somewhat sloping position, with its points less projecting, the blade blending with and forming a fine wither, rising to a line with the back.....	4
ART. 10. *Crops*, full and even, forming a true line with the shoulder and level back.....	3
ART. 11. *Back*, loin, hips, broad, level and wide, the hip bones prominent but not pointed.....	6
ART. 12. *Rumps*, lying broad apart without slope or drop, full and well covered.....	5
ART. 13. *Twist*, full and broad in its seam, well down between the thighs	3
ART. 14. *Quarters*, long and well filled between the hip bones and the rumps, with a graduated taper, and not showing the round bone, but a well turned finish, with a good muscular development extending to the hocks.....	6

POINTS.

ART. 15. *Flanks*, moderately deep, full and mellow, according to condition 3

ART. 16. *Legs*, of moderate length, standing square under the body, with sufficient angle at the gambrel joint to secure strength and activity, the toes pointing straight to the forward feet; the bone fine and flat below the hock; sinews large and clear; the forearm well developed; the bone below the knee quite small, coming nearer together as they approach the ground; hoofs dark and broad 5

ART. 17. *Tail*, set on broad and full, on a level with the back, without loose, flabby skin underneath, tapering gradually to the end, which is invariably furnished with a tassel of white hair 2

ART. 18. *Carcass or Barrel*, round, straight on the back and belly, its posterior ribs extending well back and springing nearly horizontal with the back bone. Medium size being preferable for stock breeding in the Devon 3

ART. 19. *Color*, always red, but admits of different shades. The medium red are considered as combining the largest amount of valuable qualities; the very dark red being less thrifty and generally hard handlers; while the very light red, with a thin, papery skin, are less hardy in a cold climate 1

ART 20. *Hair*, should be soft, thick and fine, and not much curly 2

ART. 21. *Carriage.* This is an important quality in the Devon, as he is destined for the yoke as well as for the butcher. He should show by his sprightly, active movements and graceful gait, that he is fitted for his proper place 4

ART. 22. *Quality.* On the thriftiness, the feeding properties, the value of the animal depends; and upon the *touch* or handling qualities rests, in a great measure, the grazier's and butcher's judgment. If the handling be good, some deficiency in minor qualities may be excused; but if it be hard and stiff, nothing can compensate for so unpromising a feature. In raising the skin from the body between the thumb and fingers, it should present a soft, flexible, and substantial feel; and pressed by the outspread hand, it should move easily with and under it, as if resting on a soft, elastic, cellular substance, which becomes firmer as the animal ripens 15

Perfection 100

The number affixed to the points described form the maximum that is allowed for each, and in proportion as the animal under examination is deficient in any point, so must the number be decreased, even should nothing be allowed for that point. Points which are characteristic, and, therefore, common to the breed, though very valuable in themselves, are marked comparatively low, because they are easily obtained, and demand but little attention on the part of the breeder;

nevertheless, an animal not possessing the characteristics of the breed, must of necessity be almost worthless. On the other hand, points of less value, which are characteristic deficiencies in the breed, or at any rate difficult to sustain at their maximum excellence, are marked numerically high, as they go far to complete the natural excellence of the animal.—*Iowa Agricultural Report.*

THE DAIRY.

With the exception of the vicinity of our large cities, almost no attention has been paid to dairying as a business, or an important branch of farming in Missouri. This is believed to be a serious defect, and one which, in some localities, there seems to be a disposition to remedy. It is very important to encourage and make a home market for our products by means of manufacturing, but in the items of butter and cheese we have an excellent home market, which is almost entirely supplied by other States. Latterly, Illinois has supplied a large amount of butter to St. Louis, while Ohio has annually supplied us with large quantities of both butter and cheese, and these articles have been purchased and shipped from New York State by the ton, by individual dealers, every year.

According to my own observation, which is limited, however, so far as the State at large is concerned, I should judge that one-half of our farmers, in midwinter, have no butter upon their tables; the inevitable "pork fat" takes its place. Comparatively few of them, it is believed, know the luxury of really good butter—such sweet, rich, good flavored, grainy, yellow butter, as we get from New York State. Very few think of laying down, in the summer or fall, a supply of butter for winter use, and if they do think of it and attempt its accomplishment, they generally fail by having it become rancid or *strong* before winter really comes.

It has been asserted by some Eastern writers, that the butter and cheese district of the United States is quite limited in extent; that out of that district good butter and cheese cannot be produced; that said district does not extend farther west than the Western Reserve, Ohio; and that good butter makers from the East have tried it in the West, and failed to make anything better than "Western grease." The same writers say that the chief characteristic of good butter land is the natural production of blue grass and white clover.

I presume that there is no place where blue grass and white clover grow more spontaneously than on the hill lands of Missouri. Our prairie lands may not be equally well adapted to butter making, but if they are not, we apprehend that it cannot be for lack of capability to produce the necessary grasses. There may be on some of the prairies a deficiency in the natural supply of the requisite pure water. Our timbered lands are generally well supplied with water by springs and creeks of durable character, and many localities have an abund-

ance of pure soft water. Milch cows should have plenty of good water, and be able to obtain it without traveling too far. Soft water is believed to be better for the cows than hard, and is probably much better for use in butter making. It is customary, at some seasons, at least, to add water to the cream in churning, and some wash the butter in cold water. Hard water contains carbonate and sulphate of lime. If butter is immersed in lime water it will become so strong in twenty-four hours as to be unfit to eat, by the action of the alkali upon the butyric acid. For this reason the purest water, which is *soft* water, must be preferable for use in the process of separating butter from milk, and such pure water every farmer should have—if not in his spring or well, then in his cistern.

The best test of good butter, perhaps, is its capability of keeping sweet and pure a year or longer, when properly packed. I cannot say that butter made in Missouri has been so tested, but I think I can say that there can be found in nearly every portion of the State some persons who make good butter, and find a ready sale for it, if they wish to, at prices twenty-five to fifty per cent. higher than the majority of Missouri butter will bring. In assuming that good butter can be produced in this State, I have no fears of being disputed by any Missourian. Why, then, has not this important branch of husbandry been better developed? Why have we not at least supplied our own markets with this necessary article?

In the first place, there has been a want of taste or disposition for this sort of farming. It has not been a part of the programme. It has not been one of the things aimed at or desired. The majority of our farmers have turned their attention to raising large crops of certain great staples. For example, immense crops of corn, which is fed to large herds of swine or cattle, or horses or mules, and when these are sold, they bring a large sum of money; or, they raise large crops of wheat, hemp or tobacco, or keep large flocks of sheep, and their returns are received in one or two large amounts. They have been contented to do thus, and buy their own butter, or do without it. Butter making for market would have appeared to such men like too small business. A system of farming, by which large profits are accumulated by means of many small profits, has been comparatively little known. Evidently, and justly, I think, such a system has not been deemed altogether consistent or profitable with our former system of labor. It is quite certain that our "American citizens of African descent" have not possessed the necessary degree of intelligence, skill, care and *cleanliness* to succeed in butter making.

In the second place, and in part, consequently, there has heen a want of good pastures. Without good feed for cows, it is impossible to make good butter. This is the first and most important requisite—the foundation of success in dairying. Mr. Flint, Secretary of the Massachusetts Board of Agriculture, in his works on "Milch Cows," and on "Grasses and Forage Plants," recommends a mixture of twelve

varieties of grasses for permanent pasture, and thinks that no improvement in grass culture is more important than the mixture of grasses. The varieties most likely to give satisfactory results, as a mixture for permanent pastures, dependent to some extent on the nature and preparation of the soil, as suggested by Mr. Flint, are as follows: Meadow Foxtail, Orchard Grass, Sweetscented Vernal, Meadow Fescue, Redtop, June Grass, Italian Rye Grass, Perennial Rye Grass, Timothy, Rough-stalked Meadow Grass, Perennial Clover and White Clover. For mowing lands he would leave out entirely the Meadow Foxtail and Sweetscented Vernal, and increase the quantity of Timothy and Red Clover.

Thirdly, and of course, no attention having been paid to dairying as a matter of profit, there is a great deficiency in good dairy stock. With the exception of a few localities, cows have not been bred or managed with reference to securing the best milking qualities. In fact, the best dairy cows would soon be spoiled, if subjected to the kind of management too generally prevalent in this State. The calves are allowed to suck for five or six months. This encourages the cows to come up at milking time, which is quite an object if she "runs out" in the range. The calf sucks till the cow gives down her milk, and then the milker finishes, standing up, holding a "bucket" or cup in one hand and milking with the other. Of course, this system is not always followed, but it is rather the rule than otherwise. I have rarely seen a negro man or woman who knew how to milk a cow as she should be milked.

With the change in our labor system, and the influx of population which we are receiving from the Eastern and Northern States, we may expect that dairying will soon become an important branch of our domestic industry. Indications of this are already manifest. For the purpose of giving information upon this subject, which is believed to be desired, I cannot do better than to give some selections from the Maine agricultural reports. Maine is like Missouri in one respect—it is dependent on New York State for butter and cheese. The Secretary of the Maine Board of Agriculture, Mr. S. L. Goodale, has presented the subject of butter and cheese making in his annual reports in a very full and able manner. He investigated as thoroughly as possible the comparative profits of converting pasturage into beef, or into milk, butter and cheese. The result of his inquiries indicated a large predominance of profit in favor of the latter plan.

Mr. Goodale says: "I have frequently inquired of intelligent and observing farmers, how many pounds of butter can be made with a good milking cow, upon the food which would yield a hundred pounds of beef, if consumed by a thrifty farrow cow, steer or ox? And I have never found one who could give an answer apparently satisfactory to his own mind. The first impression seemed to be (perhaps judging from the usual market rates of each), probably fifty or seventy-five pounds; but the more the question was pondered and observations

made in respect to it, the more they inclined to estimate it higher; perhaps fully as many pounds of butter as of beef, or even more. The matter seems to have engaged the attention of the first British Board of Agriculture, and Sir John Sinclair, its President, and probably with reference to the observations or investigations of the board, says, 'it is supposed that the same quantity of herbage that would add two hundred and twenty-four pounds to the weight of an ox, would produce nine hundred English gallons of milk.' Now, if we reckon six ounces of butter or fifteen ounces of cheese to be the average weight obtained from a gallon of milk, we will get three hundred and thirty-seven pounds of butter, or eight hundred and forty-four pounds of cheese, from the same quantity of herbage as was supposed to produce two hundred and twenty-four pounds of beef. If we convert these into their respective money values, calling the beef seven cents per pound, the cheese ten cents, and the butter twenty cents, we find the beef amounts to fifteen dollars and sixty-eight cents; the butter sixty-seven dollars and forty cents, and the cheese eighty-four dollars and forty cents; or, deducting for the labors of the dairy two cents per pound for the cheese, and four cents per pound for the butter, it would then stand fifty-three dollars and ninety-two cents for the butter, and sixty-seven dollars and fifty-two cents for the cheese, against fifteen dollars and sixty-eight cents for the beef. If these statements approach accuracy, it is easy to see in what direction the interest of the farmer lies, and it is equally easy to account for the impression which prevails in all dairy districts, (so far as my observation extends) that their occupation affords a very profitable mode of converting vegetable food into money."

Mr. Goodale then gives the details of an experiment bearing on this point, made in France, and related by M. Durand, who concludes as follows: "Thus, under whatever point of view we regard a good milch cow, it appears that she affords the most economical means by which we can derive from our pastures the alimentary matters which they contain."

"Mr. Robert Gray, of Oak Park, New Brunswick," says Mr. Goodale, "well known to many of our farmers as a breeder of Ayrshires, replied to some inquiries as follows: 'I cannot state the comparative quantities of beef and cheese to be made from a given quantity of food, as in my experience they have been made at different seasons, and in a great measure on different kinds of food. Cattle in Scotland were seldom fattened on grass, the pastures not being rich enough for the purpose. Some were fattened in winter on roots, with a little oil cake, but they were mostly sold and driven south to the richer pastures of England; but I may mention that Ayrshire dairy farmers make it a rule not to keep a cow in their stocks which will not make her (dead) weight in cheese in one season, and that on pastures scarcely calculated to make cattle fit for the butcher.' He also says, 'the quantity of milk to a pound of cheese will vary according to

the quality and abundance of the food, the season of the year, the time the cows have been calved, and, more than all, on the method of cheese making which is practiced.'"

The following article by Mr. Goodale, in the Maine agricultural report for 1862, will be read with interest by the farmers of Missouri. In regard to all the particulars of butter making, including a notice of the breeds of cattle best adapted to the purpose, it is replete with interest, and contains precisely the information which it is thought will be desired:

"BUTTER. The successful separation of butter from milk depends in a great degree upon skill in manipulation, and neither this nor habits of cleanliness and order can be gained by reading, any more than one can learn to make good bread and pastry from a cookery book. Something can be learned by reading regarding the chemical and other properties of milk. Something from the example of a competent teacher, and something more by actually doing it; that is to say, by experience.

"The first step in the road towards improvement is *to feel the need of it, and the second, to have before us a high standard of excellence, and a determination to be content with nothing short of the very best.*

"I trust no one will understand me to have intimated in the preceding pages, that we cannot make good butter in Maine. I mean no such thing. While I cannot subscribe to the remark of Mr. Flint, in his work on dairy farming, 'that good butter depends more upon the manufacture than upon any other one thing, and perhaps more than all others put together,' I do hold practical skill to be indispensible, and I believe that were proper skill and care bestowed on the butter dairy in Maine, the character and reputation of our product might be elevated very greatly, and it might rank as high in market as that which is made in any other State, though perhaps not fully equal to what might be done in sections more highly favored by nature.

"There is room and opportunity for great improvement in the butter of Maine. Some is made as good as need be, and a great deal more is made which is not; neither is it as good as it might be. One might well shrink from a mission to say to any of our worthy matrons or fair maidens, *thou* art the woman; *thy* butter is not good; but here is an evident, indisputable fact, that the utterance would be true if addressed to three out of four, and perhaps to even a greater proportion.

"It is not, however, wholly their fault. To a great extent, even, it is due to causes beyond their control, and the farmer is often more to blame than the wife or maid. Too often the cows are poor butter makers to begin with, or the pastures are scanty, weedy, and overstocked besides; in the barn the fare and treatment are meagre and shabby, and the only rooms at command for milk and butter, making and keeping, perhaps are ill adapted for their use, and far from what

they should be. Under such or similar circumstances, it is simply impossible to turn out first rate butter.

"These drawbacks seriously impair the quality of the product, and absolutely prevent a high degree of excellence, but they are not the cause of its being greasy, or cheesy, or salvy, or musty, or tainted. To apportion the blame fairly, a good many traders and customers should come in for a share, who virtually offer inducements to negligence by making less difference in the price than actually exists in value. It is said that in New York and other noted dairy States, only a very small proportion of the butter made is strictly of first quality, and yet I have often been told by hotel keepers in this State that they send there for it only because they must; but if they could depend on a uniform supply of such as they were not ashamed to set before their guests, they would pay a quarter more for it than the average price of such as is offered them. Some of our dairymen profit by this. I have not known a more successful farmer in this State than one who has made the production of butter his leading aim; everthing on the farm bent to this object, and no pains were spared, in any regard, to secure excellence; and for many years his butter, as he told me, commanded from twenty to twenty-five per cent. more than the price of such as usually passes for a very good article, and was always spoken for in advance at that. Except that his summer feed was abundant and good, the pastures being in large measure of newly cleared land, and well stocked with white clover, I could see no other reasons why almost all others might not produce as good as he.

"What has been said upon many points in the preceding pages bears with equal pertinence and directness upon the butter as on the cheese dairy, especially regarding absolute cleanliness from beginning to end, all through and all over; neatness, order and watchfulness, to see that all is done at the right time and well, etc., etc. In some respects, however, they demand not only different, but opposite management, as we shall soon see.

"The first requisite to excellence is good cows; for, as before remarked, it is the cow and not the maid which *makes* the butter, the office of the latter being to separate it from the milk, and to salt and pack it. Perhaps enough has already been said on this point, but I will venture to introduce one or two illustrative facts. Mr. Holbert, of Chemung county, New York, made some careful separate trials of the milk of twenty of the cows in his dairy. As one result, it was found that one of his best cows gave as much butter as three of the poorest—thus: one cow yielded twenty-five pounds of milk, which made ten ounces of butter; a second, sixteen pounds, which made twelve ounces, and a third, seventeen pounds, which made eight ounces. While of the better cows, one yielded twenty-nine pounds, which made a pound and fourteen ounces; another, thirty-three pounds, which made a pound and fifteen ounces; and he says the difference in quality was greater than in quantity.

"Some years ago a very large and deep milking cow, giving from twenty-five to thirty-two quarts per day, was kept with another smaller one, giving from twelve to fourteen quarts daily. Butter was made from the milk of both together, but the result being unsatisfactory, their milk was tested separately, when it was found that the milk of the smaller one produced butter of the finest quality, and nearly as much in quantity as from the milk of both combined; while it was also found impracticable to get good butter from the milk of the larger one. She was sold to go into a cheese dairy, where she gave satisfaction.

"With regard to feeding dairy cows especially for the production of butter, let me refer to the elaborate investigations and very skillful practice of Mr. Horsfall, related on the one hundred and sixth and following pages of my report for 1858. The skill and success of Mr. H. have constituted him the highest authority on this point.

"As soon as the milk is drawn from the cows, it should, with the least delay or agitation possible, be strained into pans and set at rest. In cheese making it is an object to retard the rising of the cream, and so, as cooling and agitation before leaving it at rest are means to this end, they are properly employed; but for butter the full rising of the cream is to be facilitated by every means in our power. The milk room should be so situated as never to be exposed to any offensive odors, as milk readily absorbs anything of the sort, and if it does it is as sure to be manifested in the butter as if the food of the cow possesses ill-flavor. The temperature of the room should be maintained from 55° to 58°, with sufficient circulation of pure air. Flies may be excluded by a gauze screen on the windows. The length of time to elapse after setting the milk before the cream is removed must vary with circumstances. Temperature has much to do with it. The first cream which rises is better and makes better flavored butter than that which rises later. This is due to the fact that the first cream is composed of the larger globules of butter, and the amount of casein which collects with them is much less in proportion than in the last which comes to the surface. At the temperature mentioned above, usually from twenty-four to thirty-six hours should elapse before the cream is taken off, where quantity and quality are both considered. The proper time is learned by a little practice. It is when the cream assumes a slightly wrinkled appearance, no longer adhering to the finger when lightly touched, and just as perceptible souring begins. If there be not enough to churn, it should be kept in a glass or well glazed stone jar, with a little salt added. If the jar is to receive several successive parcels, stir well when each is added, and sprinkle a little fine salt over the surface. Salt so used seems to have an effect on the little films of casein which inclose the fatty globules, so that they are more easily ruptured by agitation, and so the churning is facilitated. It is much better to churn every day, if there be cream sufficient, but if not, this mode answers a good purpose in its stead.

"Some years ago, several series of elaborate experiments were instituted by Professor Traill and Dr. Gerard, to settle various points in the production of butter. These experiments are very instructive, and worth a careful perusal. The results were subsequently verified by testing them on a working scale by Mr. Rowlandson.

"Professor Traill says: 'We had a dairy of four or five cows, but, after numerous preliminary trials, we found that the results were most uniform and satisfactory when we made each experiment on a few pints of milk only. * * * This probably arose from our being then able to carry on the process in glass vessels, which permitted us to see the progress of the operation, and to collect the product more perfectly, and also from our being enabled to use a more delicate balance to ascertain the weight of the butter obtained. We were also thus enabled to make the comparative experiments on the same milk on the same day—points of essential importance—as the richness of of even the same cow's milk is liable to vary considerably from day to day, as we found by experiment, according to her food, her health, and possibly, too, according to the state of the weather.

"We proposed to ourselves various objects, such as ascertaining accurately the increase of temperature acquired by milk in churning, (which I may state in general terms, without detailing the experiments, we found to be from 5° to 8° of Fahrenheit); the effect of external temperature on the production of butter; the effect of adding water to the churn, as is practiced in many places; but above all, to ascertain the comparative advantages in churning.

1. Sweet cream alone.
2. Sweet milk and cream together.
3. Sour cream, or that slightly acid.
4. Sour milk and cream together.
5. Scalded cream, or what is called clouted cream, as practiced in Devonshire.

"On the twenty-fourth of May the milk of four cows was drawn in the same vessel, passed through a strainer, and then divided into five portions of six English pints each, which were placed in similar basins of earthenware in a milk house, the tempetature of which ranged from 55° to 60° Fahrenheit.

"25th. The temperature of the air was very hot, 76°; but that of the milk house, by constant evaporation of water, was kept about 60°.

"26th. Thirty-nine hours after the milk had been drawn from the cows it was removed from below the cream of No. one and No. three by a syphon, and we began immediately to churn the cream of No. one and the milk and cream of No. two in glass vessels.

"No. 1.—*Sweet cream churned alone.* Having previously found that the addition of a shall quantity of cold water to thick cream facilitated the separation of the butter, half a pint of water was added to the cream, and it was found that the temperature of the mixture at the commencement of the churning was 62°. In fifteen minutes butter

appeared in grains; the churning was continued for twelve minutes longer, *i. e.*, twenty-seven minutes in all, when the temperature had risen to 70°. The butter was now collected into a mass; but from the warmth of the weather, was very soft. It was therefore put into cold water until the next day, when it was worked and washed in the usual way, and weighed one thousand three hundred and eighty-six grains. It was of a good color, and perfectly well flavored.

"No. 2.—*Sweet milk and its cream churned together.* The mixture of sweet milk and cream was churned at the same time; but though cold water was added after an hour and a half churning, no butter was to be seen. The churning was continued in all three hours, but without obtaining butter.

"No. 3.—*Sour cream churned alone.* May 28th, the cream of No. 3, which had been separated on the 26th, and placed in the milk house, was now slightly acid, and was churned after half a pint of cold water had been added to it. In twelve minutes butter appeared, and in eight minutes more it had united into one mass. During the churning the temperature had risen from 54° to 63°. The butter, when well washed and worked, weighed one thousand seven hundred and fifty-six grains. The color and taste were very good.

"No. 4.—*Sour milk and its cream churned together.* On the same day, 28th May, the milk and cream which had become acid were churned together, and half a pint of cold water was added. It was full fifty-seven minutes before any butter appeared, and before the churning seemed to be complete an hour and fifty minutes had elapsed, showing that much more time is required to churn milk and cream than to obtain butter from cream alone. The butter in this instance was diffused in small grains, and when well washed and worked, weighed one thousand nine hundred and sixty-eight grains. Its color was rather paler than the last, but its flavor was good.

"No. 5.—*Clouted cream churned alone.* May 26th, the milk and cream of No. 5 were placed in a vessel of warm water until the temperature rose to 156°. In these experiments on scalded cream we had the assistance of a Devonshire dairymaid to superintend this part of the process. She generally placed the vessel containing the milk among the embers of a low fire; but we preferred water as the heating medium. She judged of the due degree of heat merely by dipping her finger in the milk, and by the wrinkling of its surface; and we found that the heat considered by her sufficient generally ranged from 135° to 156°, and was occasionally as high as 160° or 162° Fahrenheit. The milk was drawn from below the cream by a syphon; and the latter was placed in the milk house until the following day, when it was churned. The butter weighed, when washed and well worked, one thousand nine hundred and ninety-eight grains. It had a rich yellow color, tasted agreeably, and was quite free from the peculiar scalded flavor of the milk.

"I may here state that by churning the milk of No. 1 and No. 3, we could obtain a few more grains of butter on some occasions; but we

could never obtain the smallest quantity of butter from the milk of No. 5, so completely does the scalding process separate the buttery matter from the milk.

"These and similar experiments were confirmed by many trials, and the general result was that the largest quantity of butter is produced by the Devonshire method; the next in quantity by churning the milk and cream together when they have become slightly acid; the third in quantity is afforded by cream kept until it is slightly sour; the smallest quantity is obtained from sweet cream.

"In order to decide on the keeping qualities of the butter obtained by the four processes above detailed, samples were exposed to the free action of the atmosphere. No. 1 was found to remain longer without any rancid taste than the other kinds. Nos. 3 and 4 were nearly on an equality in this respect; if there was any difference it was in favor of No. 3. No. 5 became rancid more quickly than No. 3 or No. 4. When salted for keeping, and then spread on glass plates and exposed to the air, rancidity appeared in about the same order; commencing first in No. 5, or the butter from clouted cream; next in No. 4, then in No. 3, and lastly in No. 1. The rancidity was supposed to arise from varying proportions of casein; and on instituting a series of experiments to ascertain the fact, it was found that casein existed in smaller proportions according to the power of the butter to preserve its freshness.

"In October experiments were made which proved that *over-churning*—that is, continuing the process after the full separation of the butter—was very injurious to the quality of the butter, although it increased its weight.

"The cream of six pints of milk was separated by a syphon and churned in a glass vessel. Butter was formed in about half an hour; but the churning was continued for half an hour longer, when the butter had lost its fine yellowish, waxy appearance, and had become pale and soft, while very little liquid remained in the churn. The butter was so soft that it could not be washed and worked until it had remained some hours in cold water. It was pale, still rather soft, and and weighed twenty-five hundred and sixty-six grains. That this was beyond the due quantity of good butter from such a quantity of cream, was apparent, when the comparative experiments on the same quantity of the same milk, but only churned till the butter was well formed, gave the following results:

No. 1. The sweet cream over-churned yielded two thousand five hundred and sixty-six grains.

No. 3. The acid cream duly churned yielded two thousand one hundred and eighty-seven grains.

No. 4. The acid milk and its cream duly churned yielded two thousand three hundred and ninety-seven grains.

No. 5. The scalded cream duly churned yielded two thousand six hundred and seventy-one grains.

"The butter of No. one tasted insipid, never became firm, and soon turned rancid. It was found to yield a very unusual quantity of both casein and of watery fluid, which could only be separated by melting the butter.

"It is a common opinion in some districts, that by adding hot water to the churn more butter is obtained than by using cold water. Experiments made for this express purpose did not show that the weight increased very much, and it was attended with a perceptible deterioration in quality, giving it the appearance of over-churned butter.

"The principal results of the experiments above detailed are—

1. That the addition of some cold water during churning facilitates the separation of the butter, especially when the cream is thick and the weather hot.

2. That cream alone is more easily churned than a mixture of cream and milk.

3. That butter produced from sweet cream has the finest flavor when fresh, and appears to keep longest without acquiring rancidity.

4. That scalding the cream, according to the Devonshire method, yields the largest quantity of butter, which, if intended for immediate use, is agreeable to the palate and readily salable; but if intended for long keeping, is liable to acquire a rancid taste.

5. That churning the milk and cream together, after they have become slightly acid, seems to be the most economical process, on the whole, as it yields a large quantity of excellent butter.

6. That the keeping of butter in a sound state appears to depend on its being obtained as free as possible from casein, by means of washing and working the butter when taken from the churn.

"Churning the milk and its cream together, instead of the cream alone, is strongly insisted on by the dairymen of Orange county, New York, as highly important and necessary for butter designed for warm climates or to be kept a long time. A gentleman long familiar with the practice there says of it: 'The perfect neatness and cleanliness of everything about the dairy; the churning of the milk instead of the cream, and the attention to the quality and quantity of the salt used, are the principal peculiarities. The churning of the milk I deem essential to butter intended for long voyages. It gives a peculiar firmness and fineness of texture and wax-like appearance, when fractured, which butter made by churning the cream alone seldom or never has. These peculiarities can generally be detected by the eye. There is a cream-like flavor to milk-churned butter which I have never found in butter manufactured in a different manner.'

"This method is also extensively practiced by many dairymen in other counties in New York. At the same time there are many in the same counties and neighborhoods who churn only the cream, and excellent butter is produced by both methods. When milk is churned, it should be first allowed to become perceptibly sour, and the usual practice is to add cold water at the commencement and again just be-

fore the completion of the churning. Although I have made frequent inquiries, I have learned of only one case where this method has been tried in Maine, and in that instance it was, from some cause, unsuccessful; the butter had the appearance of being over-churned, having a pale color and being soft.

"The proper temperature for churning was made the subject of careful experiments by Dr. Barclay and Mr. Allen, which are here related:

"First experiment, 18th August. Fifteen gallons of cream, at the temperature of 50°, were put in the churn, the weight per gallon having been ascertained to be eight pounds four ounces. By agitating the cream in the usual manner for two hours, the temperature rose to 56°; at the end of the churning, being four hours from its commencement, the temperature was found to be 60°, or 10° higher than at the commencement. The quantity of butter obtained was twenty-nine pounds, or nearly two pounds of butter for each gallon of cream. It was of the best quality.

"Second experiment, 26th August. Fifteen gallons of cream were put in the churn at the temperature of 55°, the weight per gallon being eight pounds two ounces. By churning an hour and a half, the temperature rose to 60°; at the end of churning, being three hours and a quarter from the beginning, the temperature had increased to 65°, or 10° higher than at the commencement. The yield of butter was twenty-nine pounds four ounces, of good quality, not sensibly inferior to that obtained in the first experiment.

"Third experiment, 29th August. Fifteen gallons of cream were put into the churn at a temperature of 58°, the weight per gallon being eight pounds two ounces. At the end of an hour's churning the temperature had risen to 63°, and at the end of the process, which lasted three hours, the temperature was found to be 67°, or 9° higher than at the beginning. The quantity of butter obtained was twenty-eight pounds, and was slightly inferior in quality to that produced in the two former trials.

"Fourth experiment, 4th September. The same quantity of cream was employed as in the former experiments, the temperature being 60° and the weight per gallon being eight pounds one ounce. During the churning the temperature increased as before, and at the end of three hours, when the operation was finished, it had risen to 68°. The quantity of butter obtained was twenty-seven pounds, of a quality similar to that in the first experiment.

"Fifth experiment, 9th September. A like quantity of cream was used, at the temperature of 66°, and the weight per gallon was eight pounds. The churning occupied two hours and a half, at the expiration of which the temperature was found to have risen to 75°, being an increase of 9°. Twenty-five pounds eight ounces of butter were obtained by this experiment, of a character much inferior to that produced in any of the former experiments, being soft and spongy.

"Mr. Ballantine also prosecuted a similar set of experiments, the results of which showed that the greatest quantity of butter from a given amount of cream was obtained at 60°, and the best quality at 55° in the churn just before the butter comes. When the heat exceeded 65°, no washing or working could extract the buttermilk from it without the aid of salt, but when salt was well worked in and the mass allowed to stand twenty-four hours, and then well washed and worked, it could be extracted.

"The same gentleman, after an experience of thirty years, came to the conclusion that butter is yielded in the largest quantity and of the best quality from entire milk, kept until it was perceptibly sour. When put in the churn, warm water is to be added, as he says, sufficient to bring the temperature to 65° (or 10° higher than when cream is churned). It should then be churned at the rate of thirty-eight or forty strokes per minute, until the butter comes, which usually requires three to three and a half hours, when the velocity is diminished in order to gather the butter.

"There is much difference of opinion among the best dairymen as to whether butter should be washed or not, some holding that the finest flavor is inevitably lost thereby, while others maintain that without washing in pure soft water it cannot be made to keep well above a year, if so long, so that for exportation or for long voyages washing cannot be dispensed with, and that, if properly done, the flavor is uninjured. Hard water, especially that containing lime, is undoubtedly injurious. It is also generally understood that butter cannot be made from red clover feed, by any process, to keep a great length of time. However good at first, it soon loses its good flavor, and is more liable to rancidity than when made from other feed. A good share of white clover is to be desired, above any other single variety of forage plants.

"The proper working of butter so as to remove thoroughly the buttermilk, is a point of the first importance. To do it properly requires the highest degree of practical dairy skill, overworking being very injurious, as it tends to destroy the grain of the butter and to give it a salvy consistence, which is very objectionable. The aim should be to secure a firm, waxy texture, and so far as working effects this, it is best secured by pressing out the buttermilk with the ladle and butter worker, by a sort of kneading motion. Drawing a ladle or spatula over it, as an apothecary prepares ointments, injures the grain and induces salviness.

"In working butter, much assistance to the complete removal of the milk may be gained by applying a slightly damp knapkin to the surface, as in this way the very small globules of moisture standing on the surface, but which will not run off, can be removed. A better way still is to use a damp sponge, covered with a napkin, for this purpose.

"At the first working, when it comes from the churn, only a portion of the salt intended to be used (say about three-fourths) should be incorporated with it, but it should be well mixed throughout the mass. The action of salt remaining in butter for some hours enables us to extract a portion of the buttermilk, which cannot be otherwise so well or so easily removed. After the first working let it remain several hours, or perhaps until the next day, when the remainder of the salt may be worked in, and the damp sponge and napkin be again used. The salt last added will dissolve after it is packed, and instead of the butter sticking to the knife or tryer as it is introduced, a clean moisture alone adheres to it, leaving the knife nearly as bright as before.

"Three very simple contrivances, easily made or obtained, but which I have rarely seen used in Maine dairies, will greatly facilitate the working of butter in a proper manner, and at the same time lessen the labor as well as improve the product. First, the sponge and napkin already referred to; next, the butter ladle, in the form universally in use in many dairy districts, which is much preferable to the flat ones commonly used here, inasmuch as drawing the flat ladle or spatula over the butter tends to destroy its grain, while the kneading, readily given with the other, answers a better purpose. The third to which I refer is the butter worker. This last named implement is made in various forms, some complicated and expensive and some very simple and yet effective. A slab of marble or of apple tree wood fixed upon a table, with a fluted roller, largest at the free end, attached to one side by a ring, is a very good form. It is well to have the slab a little hollowed towards the point where the smaller end of the roller is attached, so as to allow the buttermilk to run off more easily. The roller, acting as a lever, allows the application of considerable pressure upon the butter at a slight outlay of strength, and thus very materially lessens the labor.

"The quality of the salt used for butter deserves particular attention. What is commonly known as rock salt, made by solar evaporation, such as that from Turk's Island, is the only kind which should be used. This, as bought, is nearly pure, and what little deliquescent matter it has may be mostly removed by washing in pure water. A little loss of salt ensues, but if dexterously done, not much, and the improvement pays amply both for the loss and the trouble of washing.

"The amount of salt to be used is mostly a matter of taste. More butter is salted too much than too little. Some use only half an ounce to the pound, some a whole ounce, or even more. When more is used than is sufficient to give the proper relish (which is oftentimes done under a mistaken notion that it assists the keeping of imperfectly worked butter) it is neither so palatable nor so healthful or salable.

"*Breeds of cows for the dairy.*—The selection of cows for a dairy is a matter of the first importance. Probably one reason why dairy pursuits have attracted no more attention in Maine is the great pro-

portion of unprofitable cows. A good cow is a better investment at a hundred dollars than a poor one at ten. Very few farmers make the difference in price, either when they buy or sell, which actually exists in value. Very few have systematically sought improvements in dairy properties. Of those who have given their money, time and thought to the improvement of stock, probably ten have sought chiefly rapid growth, symmetry, working and fattening qualities, where one has sought primarily the ability to convert herbage into the greatest amount and best quality of milk; and pet steers have often monopolized more than their due share of the good food and attention.

"In working oxen we desire sufficient size and weight, muscular strength and nervous power, combined with docility.

"In beef makers we seek chiefly to lay on flesh and fat rapidly and early maturity.

"In dairy stock, what is wanted is the ability to convert the largest amount of herbage into as much good milk as it is capable of making, and at the least possible expenditure of food for mere subsistence, while this manufacture of milk is going on.

"The ability to convert food into milk is usually connected with readiness to lay on fat and flesh when dry; but flesh-making and fat-making qualities are not so uniformly connected with great production of milk. As early maturity is connected with early decay, it is not so desirable for milch cows as for meat-making cattle.

"We need, in our stock, ability to subsist on and to make the most of scant pastures. Hence we cannot use to advantage so large cattle as if our lands were richer, because they require more for subsistence than our pastures can supply, and at the same time afford a sufficient overplus to be converted into a profitable amount of meat or milk. Our climate is such that hardiness or ability to endure severe winters is indispensible. We want also a vigorous constitution and a good appetite.

"The object of the butter dairy is best subserved by cows which give rich milk. The difference in this regard is very great. Some which give only a moderate mess will produce more butter than some others giving twice as much. The object of the cheese dairy is best attained by cows yielding plentifully milk of fair quality. The proportion of butter in milk varies all the way from two to eight per cent., and in extreme cases possibly more, the average being between three and four per cent. The proportion of casein in milk is much more uniform, being only from three to five per cent. Consequently, as a general rule, the more milk a cow gives the greater the product of cheese; and if it contain three per cent. of butter, cheese of very good quality can be made from it, provided no loss is incurred in the manufacture. Yet it must be remembered that every one per cent. additional of butter which the milk contains adds ten per cent., more or less, to the

amount of cheese which may be produced from it,* and is a much greater gain in the richness of the product.

"Good milkers are not confined to any one breed; yet some breeds furnish a much greater proportion of good milking cows than others. The excellencies and the defects of our common or mis-called 'native' stock are too well known to require much remark. This stock includes some, and not a very few, excellent milking cows, as good as can be had of any other sort; and it includes a great many more, which never, from the days of their calfhood up, have paid for their keeping, and have eaten the food and received the attention which, if bestowed on better ones, would have paid a handsome profit. The only serious trouble with the good ones is, that they are not sure to transmit their better qualities, but are ever and anon 'breeding back,' and their calves often exhibit the traits of inferior ancestors. If such bulls be used as sires, we can anticipate nothing in regard to their progeny but uncertainty and disappointment. Now, in such a case, what should be done? I answer without any hesitation: let every such bull be utterly discarded at once; let every unprofitable cow go to the butcher or drover as soon as may be, and let the good ones be bred to a male of some fixed breed, possessing so firmly the desired properties, forms and characteristics, that he is sure to transmit them to his progeny. A very simple rule this, and easy to put in practice. Its universal adoption in our State would, before many years, result in a gain to be counted by millions of dollars. Well bred bulls, of the different breeds most desirable for the various uses for which cattle are kept, are now within the reach of almost every farmer, at least within the means of every neighborhood which would club together to get one.

"The Jersey race excel all others in the richness of their milk; and although the yield is not usually abundant, they deserve very favorable consideration for the butter dairy. A few Jersey cows in a herd, or a strain of this blood infused through it, leave their mark very distinctly in the richer color and more delicate flavor of the butter produced. Wherever known, Jersey butter commands the highest price in the market.

"For richness of milk the Devons probably rank next to the Jerseys, and, like them, do not usually yield abundantly, the efforts of most Devon breeders having been directed away from milk and toward the production of beef. Of late, efforts have been making by some to breed toward milk, and there exist families of this race possessing highly respectable milking qualities. When a bull of such a family is crossed upon deep-milking cows of the common mixed sort,

* To make this plainter, let us suppose milk to contain three per cent. of butter and four per cent. of casein. This would be seven pounds of solid matter to one hundred pounds of milk. This, with the water, etc., held with it, would make about ten or eleven pounds of cheese, and an addition of one per cent. to the solid matter contained in the milk would add a tenth, or from a tenth up to a seventh more to the amount of cheese.

the progeny usually manifest a good degree of adaptation for the dairy, in connection with the activity, hardiness and other good qualities for which the Devons are justly noted.

"In years past, the improved Short Horns (often called 'Durhams') were generally possessed of excellent milking qualities, and some families in a remarkable degree. These, like the Devons, have, by most breeders, been directed toward the production of meat, and often at the expense of milk; but they have not all suffered alike in this respect, and some families continue to be highly esteemed for dairy qualities. In this respect, however, success chiefly follows their being crossed upon deep milkers of the common sort. The progeny in this case possess greater size and weight than grade Devons, or than grades of almost any other breed; they need better pastures and winter food, and when these are allowed them, the returns are generally satisfactory. With good keeping, the grades make excellent cattle for most uses, and attain the largest size. The nearer they approach purity of blood, the more care and attention they require in our climate.

"The Herefords are an excellent breed for work and for beef. There may be good milkers among those of pure blood, but if so, it has never fallen to my lot to see any of them. Some of the grades, when from good milking dams, produce pretty well, but as a general, and, so far as I am advised, a universal rule, milking properties deteriorate in proportion as this blood prevails.

"The Kerry breed has been too recently introduced into this country for us to speak with confidence of its merits, but judging from what is known of it in Ireland, it may likely prove valuable in sections where larger ones would not thrive. They are quite small, very hardy, easily kept, and for their size yield largely of very rich milk. In 1858, Mr. Sandford Howard visited Kerry county, in Ireland, and purchased five heifers and a bull for A. W. Austin, Esq., of West Roxbury, Massachusetts. These I saw during the past season at his residence, with their progeny, and was greatly interested in examining them. They have increased very much in size upon the better feed given them, being now nearly as large as common cows, are very symmetrical and handsome, and were represented as giving a large yield of very rich milk. Mr. Austin indulges the hope that they will prove a most valuable accession to the stock of the country, particularly for severe climates and scant, hilly pastures. In some points they excel any cattle I had previously seen. Mr. Howard says of them:

"The Kerry breed belongs to the county of that name in Ireland, or more especially to the mountainous portion of that county, where they have probably existed coeval with the present race of human inhabitants. They are very different from the cattle which occupy the lower and more fertile sections of the island—the latter, as has already been observed, belonging to the Long Horn tribe, of large size, the horns drooping, sometimes crossing each other beneath the lower jaw. The Kerries, on the other hand, are small, with horns of medium length, rising, and generally somewhat spreading. The color ranges from black to brindled and red, sometimes with a little white,

but black is the prevailing color, and is preferred as denoting the nearest affinity with the original type. The Kerry cow has always been considered remarkable as a milker. Youatt says she is 'emphatically the poor man's cow; hardy, living everywhere, yielding, for her size, abundance of milk of good quality.' Milburn says, 'she is a treasure to the cottage farmer—so hardy that she will live where other cattle starve. She is a perfect machine for converting the coarsest cattle food into rich and nutritious milk and butter.'

"In 1858, and also in 1859, I visited the native country of the Kerry cattle, chiefly for the purpose of learning their characteristics, and purchasing some to send to America. I found the cattle somewhat smaller than I had supposed them to be, but evidently very useful in that locality—living where no other dairy cattle that I have ever seen could live. In several instances they were met with at elevations of fifteen hundred to two thousand feet above the sea, sharing with the goat the wild herbage of the mountain's side. As illustrating their hardiness, the following incident is given: A man led me up a mountain glen to see a lot of three year old heifers he had grazing there. It appeared a mystery to me how the cattle could get round and over the rough rocks, and obtain a subsistence, even in summer. Having noticed that the man had several stacks of hay down in the valley, where was the rude habitation which he called his home, I asked him if he was going to take the Kerry cattle there for the winter. He replied, 'no, the hay is for the lowland cattle and ponies.' He had just been telling of the deep snows which sometimes fall in the mountains, and I asked what the cattle would do in such cases. He said, 'the snow generally softens after a day or two, and the cattle can *work through it.*'

"It is difficult to estimate the weight of these cattle, compared with others, from what I have seen of them. They are generally large bodied in proportion to their hight, their legs being short and the shank bones very small. Their heads are generally handsome, and the countenance lively, but with a mild expression. The best of them are decidedly attractive in their appearance. When taken to the low country and supplied with plenty of nutritious food, they become more bulky; but I had no opportunity to see what would be the effect of breeding them for several generations in a milder climate and on a better soil.

"I could not generally obtain reliable statements in regard to the yield of milk or butter of these cows. In several instances where they were kept in the low country, it was stated that they would give, per day, ten imperial quarts of milk, which would afford a pound of butter—certainly a large product, considering the size of the animal. It is stated that Mr. Crosby, of Ardfert Abbey, near Tralee, obtained in his herd, ranging for seven years in succession from twenty-eight to eighty cows, mostly Kerries, an average of one thousand nine hundred and fifty-two quarts of milk in a year, which yielded a pound of butter to eight quarts—or two hundred and forty-four pounds per cow annually, and that one pure Kerry cow in the herd gave two thousand seven hundred and twenty-five quarts of milk in ten months."

"The Ayrshires originated in Scotland, in a section of only moderate natural fertility, and similar, also, to our own in some other regards. They have been brought to be what they are mainly by means of continued selection for many years, especially with reference to dairy qualities. Easily and cheaply kept, and very hardy, they yield abundantly milk of good quality—more, in proportion to the food consumed, than any other. The Ayrshire breed presents us to-day with a cow made to our hand, which, in most essential respects, is very similar to what might be reasonably expected as the result of fifty years' judicious, systematic, persevering attempts to improve our so-called 'native' cows, by a continuous selection of the best formed and deepest milkers among them to breed from, in order that dairy properties might become fixed so surely as to be transmitted with regularity and certainty. A late writer (Dr. Reynolds), in his survey of Middlesex county, Massachusetts, very justly says of them:

"Within a few years past, the Ayrshires have attracted much attention. They present, perhaps, more of the points of a good milch cow than any other breed. They are hardy, sprightly, good feeders, and present, in their whole figure, as well as in their [separate organs, those qualities that

are sought in a milch cow. They transmit their peculiar traits to their progeny, with as much certainty as any other breed. The first cross with the old stock produces animals oftentimes equal to the pure bloods for milking. The practice of crossing them will doubtless be continued, especially by those who do not wish to breed from the mixed race. Breeders who would be sure of the good milking properties of the Ayrshires, must rely upon pure blood, or they will be subject to frequent disappointment; for it is a well known law of breeding that we cannot rely, with any degree of certainty, upon obtaining the peculiar characteristics of any animal, until they have been fixed by being transmitted through several generations. The only serious objection to the Ayrshire cows is the small size of their teats. Their udders are well formed, round, compact, reaching well forward, never pendulous or fleshy, and the milk veins are well developed. A cross with the old red stock generally cures the defect in the size of the teats, but often causes a pendulous or fleshy bag. The Ayrshires fatten readily when dry, and make fine beef. This stock has been known in Scotland about eighty years, and great pains have been taken to keep it pure. The breeders in Ayrshire do not allow their stock to breed until they have arrived at such an age that defects will be developed in the animals if they exist in them. If a bull or heifer reaches the age of about three years without exhibiting defects of constitution, form or disposition, they allow them to breed. If defects begin to show themselves, the animals are turned to the butcher. In this way they continually improve the breed. Our farmers, on the other hand, permit the heifers to come in at two or soon after, and put the bulls to cows when they are eighteen months old, and use them beyond their strength, so that by the time they are three years old they are nearly worthless. I cannot but think that the course pursued by the Ayrshire dairymen is altogether the most judicious. No breeder, who regards the reputation of the stock which he raises, should ever breed from defective or imperfectly developed specimens; and certainly no farmer who raises stock for his own use, should subject himself to the loss that will surely result from such a course. 'To breed from the most perfect specimens of the best kind of stock,' should be the farmer's motto."

"Dr. Reynolds does not intend to say that breeders for dairy purposes merely must employ pure bred females. These are absolutely necessary only for the breeder of pure stock. A cross of the Ayrshire bull upon good common cows is what is needed, as most profitable for dairy purposes. It would not pay to introduce pure bred cows simply for their milk. Successful crosses and high grades are often fully equal to pure bloods for all purposes *except breeding;* but such, *i. e.*, the males, should never be kept for bulls, unless merely in place of worse, for though not to be depended upon to transmit their virtues, they do sometimes, and so are preferable to scrubs. For a milk or cheese dairy, I would prefer Ayrshires to any other, but for a butter dairy, I would be loth to dispense wholly with the Jerseys.

"The finest herd of Ayrshires in this country undoubtedly is the one owned by H. H. Peters, Esq., of Southborough, Massachusetts.* Last summer, in looking over his cows, I noticed one which was yielding at the time about fifty-five pounds of milk daily. Mr. Peters, at my request, has lately furnished me with a statement of her produce during one hundred and fourteen days. For steady continuance of a great yield of good milk, I think it doubtful if there be any authentic statements of its ever having been surpassed. It is as follows:

"The cow 'Jean Armour' is a thoroughbred Ayrshire, six years old, was calved May 1, 1856. She was imported by me in 1838, from Scotland; her last calf was dropped May 20, 1862, and she

* This herd was sold at auction in the spring of 1865. The cow Jean Armour, nine years old, brought four hundred dollars. Exclusive of the bulls, the fifty-four head of cows and heifer calves sold in the aggregate for eleven thousand three hundred and fifty-five dollars, being an average of two hundred and ten dollars each. It is believed that Mr. Peters tacitly, if not openly, admitted, previously to his sale, that the herd of Mr. Samuel Campbell, of Oneida county, New York, was superior to his own.—[L. D. M.]

will calve again in March, 1863. The daily product of milk has been carefully weighed from June 1 to September 22, inclusive:

30 days in June she gave 1,524½ lbs., averaging 50 5-6 lbs. daily.
31 days in July she gave 1,606 lbs., averaging 51 5-6 lbs. daily.
31 days in Aug. she gave 1,441 lbs., averaging 46 1-2 lbs. daily.
22 days in Sept. she gave 1,041 lbs., averaging 47 1-3 lbs. daily.

"Her total product from June 1 to this date, a period of 114 days, is 5,612½ pounds, averaging 49 pounds and 3 ounces per day. She gave the second ten days in June 521½ pounds of milk, averaging over 52 pounds per day. She gave the second ten days in September 462 pounds of milk, averaging over 46 pounds per day. Her milk was set for three days in July, and 6 pounds 3 ounces of butter was made from it. The cow weighs this day, being in better order than at any time during the summer, 976 pounds. She has had a good pasture through the summer, and since June 12 has received an average of three pints of corn and cob meal and three pints of shorts daily, and for the past week corn stalks once a day. Her greatest yield of milk in any one day since June 1, was 58 pounds; the smallest was 43 pounds.

"The difference in value between good cows and poor ones was forcibly stated by Mr. Arnold, a dairy farmer of Herkimer county, before the Farmers' Club at Little Falls, New York, as follows: 'The difference in the products of cows in different dairies, and often of those in the same dairy, is notoriously very great, even where the feed is abundant and alike good. If examined carefully, it will be found to be the chief cause of difference in the profits of dairying. To illustrate, let us suppose a case. It often happens that one cow will produce three times as much cheese as another; the cows being of equal weight and fed with the same kind of food, one may produce two hundred pounds and the other six hundred pounds. Instances of this difference are not uncommon. It is evident that the one giving the greater quantity will require a greater amount of food. But the food and the milk will not be in the same ratio. To make this plain, suppose it costs fifteen dollars to supply each cow with food sufficient to support her body and maintain animal heat for a year, and for each hundred pounds of cheese it costs two dollars and fifty cents worth of food in addition. The first cow will require five dollars worth of feed extra to produce two hundred pounds of cheese; and the second fifteen dollars worth to produce six hundred pounds. Let us compare these items:

"'Cost of keeping first cow, twenty dollars; product, two hundred pounds; cost per pound, ten cents.

"'Cost of keeping second cow, thirty dollars; product, six hundred pounds; cost per pound, five cents.

"'But the food which will support three cows like the first, will only support two like the second, and consequently where thirty like the first could be kept, only twenty like the latter one could be maintained. Let us now set these two dairies and their products side by side, and see how they compare, remembering that the cost of maintaining each is the same:

"'First dairy, thirty cows, product, six thousand pounds.

"'Second dairy, twenty cows, product, twelve thousand pounds.

"'In the first, only a quarter of the food consumed is converted into milk; in the second, one-half. Suppose cheese to sell for eight cents per pound, the larger dairy will work a constant loss to the owner, while the other will yield a handsome profit. Whether the exact cost of keeping, or of the extra amount of food to produce a hundred pounds of cheese, is accurately represented here or not, the principle is not invalidated. It remains proportionally the same for every imaginable case.'

"Another dairyman gives the following statistics of the facts regarding the five best and five poorest cows in his dairy in 1857.

"'Five best credit by an average of 554 gallons of milk each, which realized in butter and cheese sold, 11½ cents per gallon			$63 71
Dr. to 2½ tons hay, at $8 per ton	$20 00		
30 weeks pasturing	7 50		
2 cwt. ground in the spring	3 00		
10 per cent. interest on cow (say $45)	4 50	35 00	
Net profit of each cow			$28 71
Five poorest cows credit by an average of 243 gallons of milk, which realized as above, 11½ cents per gallon			27 95
Dr. to cost of keeping as above		35 00	
Loss on each cow			$ 7 05

"Five cows paid him a profit of one hundred and forty-three dollars and fifty-five cents, and five others involved a loss of thirty-five dollars and twenty-five cents during the season. Of course he did not keep the poor ones another season. His dairy of forty-three cows averaged four hundred and fifty pounds of cheese each.

"*Management.* Without attempting to discuss the details of feeding and treating dairy stock, I will notice briefly some of the points to be kept in view. No matter how good cows are procured, stingy feeding and shiftless management will soon run down the stock and dissipate all hopes of profit. 'What is worth doing is worth doing well;' and 'what is worth having is worth taking care of.' There is no worse economy than neglect and indifference to the comfort and health of the animals from which we look for profitable produce. Care and attention may secure all we desire, while neglect will surely nullify all the advantages which might be looked for from the possession of the best facilities.

"Let us suppose the dairyman provided with a stock of good cows; the next point is to bestow proper treatment, and especially to feed them well. No dairyman can afford to do otherwise. Look at it. A cow is wanted to give milk, and good milk. She cannot make it out of nothing. The more milk we want, the more material must be supplied to make it of. The reasoning adopted by Mr. Arnold above, with a slight modification, will meet this case. Be your cows ever so good, they must be supported, their own systems must be maintained, waste must be repaired, respiration sustained—or, in a word, the

machine must be kept in working order; and it is only what the cow can be induced to eat and to digest over and above what is required for maintenance of the animal, which goes to make milk.

"Milk is a secretion; that is, it is secreted or separated by the action of a gland, and mainly or wholly from the blood which passes to it. We know very little of the nature of secretion, or of the forces which are at play in it; but we know the fact that certain glands have the power of appropriating parts of the organism, or of the food, in order to produce certain fluids. As these secretions come from the blood, this fluid must be supplied with the necessary materials; for the mammary gland of a cow can no more make or separate something from nothing than any other apparatus or machine can do it. Milk is variable in composition, depending partly on the peculiarities of the cow, or of her glandular system, but largely, also, on the food supplied, both its quantity and its quality. If the food contain much fatty and starchy matter, the milk will be richer in butter than if they be scanty; if the food be rich in vegetable albumen or other nitrogenous substances, the milk will be richer in casein.*

"On page 79 is mentioned a remarkable instance, to which special attention is invited, showing the effect of scanty and innutritious food, in which, by actual analysis, milk was found to contain only a quarter part as much butter as milk produced under more favorable conditions. In such cases, be it remembered, it is the butter, chiefly, which is wanting. The casein fell off considerably, but not nearly so much as the butter. If milk is yielded at all, its proportion of casein rarely falls below three per cent., and it does not often exceed four per cent., while the proportion of butter varies from one and four-fifths to eight per cent. It is a matter of prime importance to butter makers that the cows have nutritious food, and scarcely less so to cheese makers, inasmuch as both quantity and quality suffer by want of it.

"Milk is liable to other changes than those produced by food, or by any outside agencies subsequently to being drawn. In woman, we find that anything which tends to irritate or annoy her, or to produce an exhibition of anger, produces at the same time serious changes in or partial destruction of her milk. We can observe this with more distinctness in her case, but similar causes produce like results with the lower animal; and consequently every means should be used to insure tranquility in our milch cows. Everybody knows that when a cow is driven rapidly on her way home to be milked, the milk is lessened, becomes hot and is more liable to become sour. That portion of food which supports respiration, and the animal heat is precisely the same which, if not so used up, goes to form butter, and every cause which increases the rapidity of breathing, diminishes the amount of butter which she might otherwise yield. Cows should be driven as leisurely as they will walk, never harrassed, annoyed or

*This last rule holds, however, only up to a certain point, say about five per cent., beyond which albuminous as well as oily foods only increase the proportion of butter in the milk.

irritated by man, boy or dog. Harsh treatment of any and every sort, exerts a very injurious effect upon the milk, and by reason of both mental and physical causes.

"The operation of milking should be governed by the same general rule; use only kindness, and let the animal understand that she is approached with none but friendly intentions. In ninety, and perhaps nine-nine cases out of a hundred, kicking and all other vicious tricks, originate in disregard of this rule. Milking should be at regular intervals; as soon as the proper time comes, if the cow is not milked, she becomes restless. Let the parts be cleaned thoroughly, and beginning slowly, let it soon be as rapid as consists with gentleness, and complete. The 'strippings' are from five to fifteen times as rich in butter as the milk earlier drawn. We cannot afford to lose this; and what is of more consequence, leaving some in the udder tends to decrease the secretion—poor milkers dry up cows. The experience of a writer in the *Boston Cultivator* is much to the point in this regard. He says: 'When I commenced farming I milked all my cows with my own hands, and the result was that no one in town could boast of having made more butter, according to the number of cows, than we. I well remember having a noble cow for milk, which would fill a twelve quart pail twice a day, and that a friend visiting us was anxious to milk her. Being well aware of the bad effects of permitting a poor milker to milk cows accustomed to one faithful, regular hand, I unwillingly consented. The result was that he obtained about a quarter less milk than she usually gave, and, although I tried faithfully to draw more milk after he had finished milking, my efforts were in vain; and it was several days before I could obtain from her the amount that she was accustomed to give. My manner was to milk as fast as possible until a cow was milked entirely clean. At one time I was obliged to stop milking a few minutes, and I found that the cow had drawn up her milk, and I could not get it that evening. This taught me the importance of employing one regular, steady hand at milking.'

"For summer feeding, nothing equals good pasture; and in nothing else is a thorough reform and improvement more needed than in regard to our pastures. Look at it! No small portion of a Maine farmer's labors are directed to the production of *winter* forage—to the obtaining of means whereby his animals may be kept in health and vigor from autumn to spring; and, aside from this preservation, little else is obtained from the food which costs so much thought, care and labor. Growth, production of meat, production of milk, almost all of which goes to constitute income or profit, comes of summer food, which costs comparatively little. It is, therefore, the plainest dictate of common sense and economy that animals, wintered at so great expense, should be furnished with abundant material to manufacture into meat or milk during so much of the year, as their food costs nothing for curing and harvesting, and so the most profitable results be obtained from them which they are capable of yielding. As a

general rule, our pastures have been sadly neglected and overstocked. Overstocking is injurious, not only by defeating the object just named, but also by reducing the health and vigor of the grasses. To have a plant healthy and strong, there must be top as well as root; no plant can thrive without both; and although the grasses will endure closer cropping than any other class of plants, this should not be made an excuse for overtaxing even their powers of endurance. Overcropping is also injurious, by unduly exposing the roots to the scorching suns of summer and frosts of winter, whereby the finer grasses are killed out, and even the poorer ones much weakened.

"Neglect is as common as abuse. The encroachments of bushes and divers sorts of vile perennial weeds tend to exhaust as well as uselessly to occupy the soil, and to starve out and crowd out nutritious grasses. Much of the land occupied for grazing purposes, by reason of its position, and for various causes, is incapable of improvement by the ordinary processes of cultivation; and not a little is so rocky as entirely to forbid the entrance of the plow. Such lands, nevertheless, when not overstocked, nor allowed to grow up to worthless bushes and briers, are often capable of yielding the sweetest feed of any. Let us not be too exacting. We do not expect mowing fields to sustain full production without assistance; why should we ask so much more of our pastures? When plants grow vigorously, the roots decompose a portion of the soil, to some extent, and obtain from thence the materials which, in connection with those obtained from the atmosphere, are elaborated in the leaves and increase both top and root. A part is fed off, usually more or less decays and makes a top dressing for the soil, but after all, there is a draft upon the fertility of the soil which needs, somehow or other, to be made good, or it gradually becomes exhausted. How to do this, to best advantage, is a problem worthy most earnest and careful investigation and experiment. It must not be disguised, rather should it be well understood at the very outset, that the draft upon the productiveness of the soil is more severe when fed by dairy stock than by any other animals which have attained their growth. With new lands it may not be seriously felt for many years, but unless the soil be unusually rich in phosphates, it will be felt eventually. The amount of phosphates taken up by one cow, supposing her to bear a calf and to yield seven hundred gallons of milk per annum, has been stated by Prof. Way to be as much as can be replaced by from forty to fifty pounds of bone dust; and it may well be believed that a demand such as this would be seriously felt in a course of years.

"I am not aware that the deficiency of phosphates in the soil has caused much suffering in Maine from the 'bone disease,' which is caused by a greater demand for bone forming material than the food supplies, but it has been occasionally seen here, and it is understood to have become a pretty serious evil in some parts of New Hampshire. In such case, as the food does not furnish a supply, the bones of the

animal itself suffer, earthy matter is absorbed from them, they become soft and yielding, and the poor creature is with great difficulty able to sustain its own weight. Instinctively, such animals crave bones, and if one be found, it is gnawed and chewed as a sweet morsel, preferable to any other food. A temporary remedy is found in feeding out bone meal, but a far better one, and a permanent, is a sufficient dressing of crushed bones to the land. Of all applications to pastures, none equal crushed bones, both in efficiency and permanency; and the utmost care should be used to save all the bones upon the farm. They can be coarsely crushed by pounding, or they can first be softened by the action of wet ashes or hot manure, and be more easily crushed afterwards. Ashes are next to bones in value, as they contain potash and the phosphates. Lime and gypsum are cheap, and in many cases most efficient fertilizers.

"With regard to the practice of dividing pastures, so as to allow a change from one portion to another, I may remark that in the best dairying district it is disapproved of and has been mostly abandoned. On this point Mr. Williard says:

"'Cows confined to one field are more quiet and contented—they will usually go over, in the course of the day, every portion of the field, selecting their food, and when filled they lie down to rest, and manufacture grass into milk. All extra labor, excitement, and gluttonous feeding, from an over stimulated appetite, lessons the quantity of milk. Everything about the 'every day pasture' is familiar, and if food is abundant they have no thought beyond leisurely taking their meals and reclining at ease on some favorite spot, ruminating or dozing over their '*knitting work*,' as Mr. Fish aptly terms it—no shadow of discontent clouding their peaceful and seemingly happy existence.

"'But let a bite of grass in new fields be had, and all this is changed—they overfeed, and in consequence, their health is more or less deranged; they tramp round in every nook and corner of the field, in search of dainties—become restless or discontented, and not unfrequently some of the more active and enterprising members of the herd try fences and make excursions into fields of grain and prohibited crops.

"'We have seen herds with one or two unruly disposed members, though perfectly quiet and orderly while confined to one pasture, become so restless and discontented, from a change to new fields, as to be exceedingly troublesome, and to cause serious losses.

"'There are other reasons—the cost of building and maintaining a division fence is a considerable item. The pastures, too, will not be so uniformly cropped; large portions will get a rank growth, be rejected by stock, and therefore afford less nutritious food through the season, than when used as one pasture. Fresh pastures are more apt to produce scours, as is well known, deranging the appetite and health to a greater extent than when confined to one field. The argument generally used in favor of two pastures is, that the daily tramping of the cattle on the one pasture renders the food less fresh and palatable, and that the alternate pastures obviate this, giving time for grass to grow, and thus producing more food and better results. The conclusion arrived at is not true in fact—stock when turned into a new pasture do not rest until they have roamed over and examined every part of it, and will tramp down, soil and destroy more food than if the same land was in one pasture, thereby really affording or rendering available a less amount of nutritious food during the season to the herd.

"'Cattle, it is true, like a change of food, but this change should consist in the variety of grasses, in the same pasture, and not in different fields.'

"To provide for the almost certain deterioration of pastures during the dry weather of July and August, there should be a good supply of succulent food in reserve, to be cut as required. Clover and oats furnish excellent green food; but the cheapest, and, on the whole, the best mode, usually is fodder corn; Southern, or sweet corn, sown

closely in drills or broadcast, on land in good condition, an acre to every eight or ten cows. If not all required during the summer and autumn, it furnishes an excellent winter fodder.

"Productive cows, if not freely supplied at this season, are apt to run down, and it will be found both easier and cheaper to maintain condition than to restore it after being lost. Besides, if allowed to shrink much in their flow of milk at this season, generous feeding subsequently, especially if the cow be with calf, will tend rather to lay on flesh than to restore the secretion of milk. It will be found good economy to lay in a large store of roots for winter feeding. For this purpose the carrot and mangold offer many advantages. The first is the more nutritious, and on soils adapted to it, and with clean and rich culture, is easily grown. It is good from autumn to spring. The mangold succeeds better on clayey loams, and within reach of sea breezes; or if in the interior, the land should have a dressing of salt some weeks before sowing the seed. These keep late, and are best during winter and spring. If used earlier, they are liable to produce scouring. With good management and in a fair season, the equivalent of from six to ten tons of hay can be grown on an acre. Turnips give more or less flavor to milk, but to cows not in milk they may be fed to advantage. If much rough or coarse fodder is to be used, roots are indispensable, and they are of great assistance, even with good hay. In quantities not exceeding a peck per day per head, they are of considerably greater value than the mere amount of nutriment they contain, inasmuch as they assist the digestive process, and enable the animal to obtain more nourishment from the other fodder consumed than they otherwise would do. When fed out more freely, we must expect benefit only in proportion to their nutritive matter, but this alone is sufficient to warrant their extensive cultivation; and when their great efficacy in preserving the health and condition of animals is considered, the neglect to supply them seems almost inexcusable. If condition be lost during winter, little or no profit will be realized in the best part of the succeeding season. In early spring, as the cows come in milk, they should have liberal feeding; plenty of good early cut, well cured hay, with carrots or mangolds, and perhaps a feed of shorts or other grain or meal, once a day. Oats and peas ground together, barley and buckwheat meal will give a better flow of milk and conduce more to the health of a cow giving milk than Indian corn, which, as some express it, seems to be of 'too heating a nature.'

"In various ways I have endeavored to illustrate and enforce the importance of liberal feeding and good management throughout. This is from a conviction that it is the most profitable method. The general practice of the State has hitherto been to keep too large a number of animals, to winter as many as can squeeze through, and to summer as many as can get along tolerably. Let the practice be

changed, and the aim henceforth be—the greatest quantity and best quality of product for each head kept.*

"*Swine in connection with the dairy.*—The manufacture of pork, as a side product of the dairy, demands some notice. A very considerable proportion and amount of the pork and lard consumed in Maine are brought from the Western States. It is considered doubtful whether it is practicable to grow it here on a large scale, in successful competition with that from the West, where mast and Indian corn are so very abundant and cheap. But to as large an extent as swine can be fed here upon the waste of the dairy and other refuse food, there is no doubt that the returns are excellent. In the piggery all the spare buttermilk and whey are readily converted into an article of considerable money value, and one which always commands a ready sale; and so it must be deemed an important appendage to the dairy. It is of more consequence, where butter is the principal product, than in cheese dairies. Whey contains a little butter and casein, (the less the better, for these are not profitably converted into pork,) a little albumen and saline matter, together with about four and a-half or five per cent. of milk sugar, and the rest, say about ninety-three parts in a hundred, of water. Sugar is a valuable constituent of food, but it is ill adapted for an exclusive diet, for it does not contain all the elements needful to healthy growth. Whey (first soured, as a free use of sweet whey is considered unsafe,) should be deemed, and should be used only as an important adjunct to other food.

"Swine, in a state of domestication, and as usually kept in confined filthy quarters, are very liable to many forms of disease. It is difficult enough to grow wholesome pork with good and sufficient food, but when hogs are kept for months together upon whey alone, as is sometimes done in cheese dairying districts, the meat may be depended upon as particularly unwholesome, and especially to be

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* "To show what may be done, I quote a statement of the products of a very noted dairy farm in Chenango county, New York, published in the *Country Gentleman*. The farm embraces only fifty-six acres of improved land, yet yields more profit than many of double its size.

"*Statement of the proceeds of the dairy of Albert Yale, for* 1861.—The number of cows I have milked this season was ten, the same as last year. My memorandum shows that the first tub was filled March 16. My cows calved, mostly, in the month of March.

Total amount of butter made, lbs	2,785
Amount sold	2,305
Leaving amount used in family and on hand	480
Amount of sales of dairy, 2,305 lbs., at 23 cents	$530 15
Amount used and on hand, 480 lbs., at 23 cents	110 40
Eight deacon skins, at 50 cents each, sold	4 00
Three calves raised on skimmed milk	17 50
Value of pork raised, deducting cost and corn	59 05
	$721 10
Making the average to each cow	$72 11
Number of pounds to each cow	278½

"You will notice above that there are eleven calves accounted for, and but ten cows. One cow had two calves.

avoided. Fed, however, in connection with bran or shorts, Indian meal or buckwheat meal, whey serves an excellent purpose for swine, and adds very considerably to the dairyman's income.

"Sweet whey is advantageously fed to young calves. 'When a pint or more of buckwheat flour is added to sixteen or eighteen quarts of sweet whey, it forms a nutritious food, on which calves will thrive almost as well as on milk; at least, after one week's feeding on milk they can be raised on whey, as above, without detriment.* In Herkimer county the practice of feeding whey to cows, instead of to swine, seems to be gaining ground. On this point Mr. Willard says: 'Whey is also fed to cows giving milk, and with so good results that many prefer to dispose of it in this way, believing it to be the most profitable method; cows soon become fond of it, and the increased quantity of milk pays better than feeding it to swine.'

"In addition to the ingredients of whey, buttermilk contains nearly all the casein of milk, and as this is its most nutritive constituent, buttermilk is more than double the feeding value of whey, to swine; and with much less additional food, good pork can be made from it.

"Milk being very sensitive to bad odors, it is of much importance to have the piggery so situated and managed that no evil come of it to the more important products of the dairy. Let it be well supplied with dry muck, dug the winter before, or if this is not to be had, dry loam or clay answers an excellent purpose in absorbing and retaining what is both offensive to the senses and enriching to the land when applied to it.

"Care and good judgment should be exercised in the breeding of swine, for no class of farm stock more readily degenerates when these are neglected; and no other is more quickly improved by skillful breeding. A pig, to be really good, should possess sufficient size, length of back, shortness of leg, fine bone, thin skin, fullness of cheek, breadth of chest and quarters, and a hardy constitution. Farm uses are generally best subserved by a breed which, avoiding the bad, unites the good points of opposite types of the hog family. The size, flesh and hardiness of the old grazers joined to the improved form, early maturity and easy fattening of the Chinese, Suffolk or Essex breeds, will give a very desirable pig. The Newbury Whites and Bedfords used to be something near this; and the Chester breed, now so popular, is like it; the former nearly 'ran out' by neglect and careless breeding, and the latter will do so before many years, if as carelessly bred. The price or success is constant vigilance; and not only in pig growing, but in all agricultural labors; not to say, in all other interests also."

THE FACTORY SYSTEM OF CHEESE MAKING.

With the present prices, and with the present quality of the milch cows in Missouri, there is no doubt cheese making will be found more

*Williard's Essay in New York Transactions, 1860.

profitable than butter making. From three to four pounds of cheese can probably be produced from our cows to one pound of butter. But to make cheese with the most profit requires a large number of cows. The process requires time, and cannot be hastened without serious injury. It requires but little more labor and no more care and attention to put a large quantity of milk through the process than a small one. It costs about as much to make up the milk of ten cows as it does the milk of fifty, and but little more, with proper appliances, to make up the milk of five hundred cows than fifty.

Jesse Williams, living near Rome, Oneida county, New York, about twelve years ago conceived the idea of turning this fact to practical importance, by making up the milk of his neighbors. The plan worked well, and before long he had increased his facilities so as to make up the milk of four hundred cows or more.

I have said that farmers are sometimes slow to learn. They are usually cautious, and slow to change long established customs and practices, but the advantages of this new notion were so great and so evident, that similar establishments were soon started, and their number has increased so rapidly that now there are probably more than fifty such establishments in Oneida county. The plan has been adopted in almost every county in New York, and many have been established in Ohio and other States.

The plan of these cheese factories or associated dairies, is for a number of neighbors to associate, choose directors and adopt some general rules for the guidance of the association. Generally some person agrees to put up the buildings on his own account, and manufacture and take care of the cheese at a fixed price per pound, demanding a contract on the part of the farmers to furnish the milk of a requisite number of cows for a certain number of years.

"The milk of about four hundred cows, it is believed, is about the smallest quantity that can be employed by the manufacturer, (when cheese making is his sole business), in order to obtain a fair living compensation for his services, while the milk of a thousand cows can be manufactured at but little extra expense comparatively."

Milk is brought to the factory sometimes from a distance of five miles, but generally it is obtained within a distance of two or three miles. The milk of each dairy is weighed or measured as it comes in, and the manufacturer receives usually about one cent per pound for making. Farmers save the trouble of making, and owing to the uniform good quality of the cheese, get about two cents more per pound for it than for the home-made article.

To run the factory using the milk of six hundred cows, will give employment to at least four hands, half or more of whom may be females. Mr. Goodale says he was informed that the actual cost of running one of these factories in New York, using the milk of six hundred cows, was seven hundred dollars. He presumes that this did not

include the interest on capital invested, and estimates the amount of money realized from the business of manufacturing, as follows:

"Allowing that the six hundred cows produced on an average, four hundred pounds of cheese each, there will be an aggregate of two hundred and forty thousand pounds. The cost of a well constructed factory will be not far from three thousand dollars.

We have then 240,000 pounds, at one cent		$2,400
Cost of running factory	$700	
Interest on buildings, etc	180	
Annual wear and tear or depreciation	200	
		1,080
Profits		$1,320

In a dairy of good cows, an average of six hundred pounds each, and as high as seven hundred pounds each, of cheese is obtained annually. If the milk of one cow will yield six hundred pounds of cheese, which is worth twenty cents per pound, it will give one hundred and twenty dollars as the yield from one cow per year. If but four hundred pounds are made per cow in a year, and two cents per pound is deducted for the cost of manufacture, the result will be an amount nearly double what the animal would bring in beef, and the cow would still be held for another year's profit.

Are there not hundreds of farmers in Missouri who could within a year establish dairies of five hundred to one thousand cows upon their immense farms? Could they realize anything near the same profit from their lands, if devoted to any other kind of farming? The wholesale price of cheese in St. Louis is now twenty-two to twenty-three cents per pound. If two hundred and forty thousand pounds of cheese is made in a year from six hundred cows, and sold at twenty cents per pound, it would amount to forty-eight thousand dollars. This would be sufficient, it seems to me, to pay for the cows, the buildings and fixtures, and hired help, and leave a surplus of ten thousand dollars to fifteen thousand dollars. After the first year, having the cows on hand, and being able to more than keep up the number by the natural increase, a very large profit could be annually realized. Such a plan would suit those of our farmers who have been in the habit of farming on a large scale, provided the necessary help of the right kind could be obtained. The difference in the results of this plan and that of feeding large numbers of cattle for beef as many do, must be quite apparent.

After selecting the best cows to be found, a few Ayrshire bulls, to produce milking stock of better quality, would be important.

Experienced hands to manage the cheese making, and perhaps to some extent milkers, would have to be obtained from the East. An ice house, and a location where an abundance of good spring water could be obtained, would be important considerations. Scarcity

of pasture could at first be remedied by sowing rye and corn for feeding green, and the cows would learn to drink the whey.

No fears need be entertained of overstocking the market. When our home demands are suppled, we can find markets in the Southern States, in the West Indies, South America and California. Almost any quantity may be sold in Europe, if a uniform good quality is produced. The demand for American cheese in England has been rapidly on the increase since the factory system was introduced. In 1859, the amount shipped to England was nine millions of pounds. In 1860 it amounted to twenty-three millions; in 1861, to forty millions, and has since reach over fifty millions a year.

The American cheese is largely consumed in England, and that the American factory system has attracted attention there, may be seen from the following quotation from an English paper, the the *Mark Lane Express:*

PRODUCTION OF ENGLISH CHEESE.

The manufacturing of English cheese is daily becoming a most important question. The price of cheese is yearly advancing; and may I ask in what way it may be accounted for? It is by reason of the consumption being greater, or by the principle of a decrescent production?

We have heard much of the American cheese, and we are well aware it is very largely imported into this country. Notwithstanding the supply from America is increasing, the scarcity exists, and extends. Amongst the supply some can be found "quite the cheese;" but we are burdened with the thought that the whole supply is becoming more inefficient to provide, and more inadequate to supply, the wants of an ever-increasing English population. While I acknowledge the home consumption and the supply from abroad to have increased, I cannot but lament that the production of English cheese has been on the decrease. In these remarks I make especial reference to the midland counties. I am unable to speak with any degree of confidence of the dairies of Cheshire, Gloucestershire, or other cheese making counties; but of dairies of the midland counties I do say that, during the last twenty years, there has been a gradual, though now it has assumed the form of a radical change. In my own parish there is sixty-seven per cent. less cheese made than twenty years ago; and many other parishes in Leicestershire are at as great if not a greater ratio.

The cause of this change in the farming of these counties is to be attributed to the advance and altered mode of living of agricultural society. One main reason is the anxiety, trouble and annoyance of cheese making in the household. We readily admit the impossibility of the mistress obtaining the three household requisites of neatness, cleanliness and regularity, when the business of making cheese is

performed in what should be a private house. The other reason which I may mention lies with the dairymaid. This personage and the milk-maid, which our ancient poets did so much to celebrate, are fast losing that renown which was formerly attached to them, and, I am firmly persuaded, will soon be of the past. The dairymaids that are to be obtained are chiefly of that class which requires the strict eye of the mistress to make cheese making successful. It is a notable fact that the breed—if I may be allowed to use such an agricultural expression—of dairymaids is yearly diminishing. I think the time is far distant when cheese making apparatus—although I far from overlook the usefulness of many—will be very generally adopted by Leicestershire farmers. Unless there is some system pursued by which it can be manufactured independently of the farmer's private residence, I see no other than that the making of cheese will continue on the decline.

Will it serve the best interests of the country for cheese making to be discontinued? I think I may say, for many reasons, it will not. Without cheese making we should be struggling against a scarcity of stock. It is clearly perceptible that an abundant supply of stock is co-existent with the dairy, and *vice versa*. Is it not probable that the present cry amongst farmers, of the dearness of store animals, may be accounted for in this way? If all will be feeders, and none will be breeders, we shall no longer be independent of other countries for our supply of either stock or cheese. Dairying is objected to by some on account of its impoverishing nature; but, with liberal feeding and an occasional dressing of some fertilizer, this objection may be overcome, and the profit remaining may be handsome.

If, then, it is desirable that cheese should continue one of the principal products of British agriculture, what system can be adopted to promote that desire? I say firmly, but emphatically, the American. The various cheese making apparatus might be used with great advantage; and the economy in power for pressing, and the saving of labor, in an establishment on a large scale, might be such as greatly to reduce the cost of making.

Factories for making butter are much talked of in New York, and, to some extent, are in use; also, the plan of making both butter and cheese in the same factory and from the same milk is attracting much attention, as being probably the most economical of all. Mr. X. A. Willard, a dairyman of large experience in New York, says, in an article in the *Country Gentleman*:

"If the erection of a factory, receiving the milk from two hundred cows, was contemplated for butter making, it is a question whether the system adopted in Orange county would not be preferable.

"Factories are established there in which both butter and cheese are manufactured. The buildings are constructed similar to factories for making cheese in Herkimer and Oneida, with the addition of a spring room and cellar, or room suitable for churning and working the butter. In the spring room the water is flowed into large tanks or

vats. The milk, when received, is put into long tin coolers, eight inches in diameter, and in height equal to that of the water in the vats, which may be from fourteen to eighteen inches. The milk of a day is allowed to stand in the water until the next morning, when it is taken out, the cream skimmed off, and returned to the same vessels and set in the water to sour, preparatory to churning. The skim milk is placed in the milk vats and made into cheese. Good butter is manufactured by churning the cream either sweet or sour.

"Mr. Slaughter, who has a factory of this kind in Orange county, informs us that he has no trouble in making first quality of butter in this way, though he thinks a little better flavored butter is obtained when the cream is churned sweet. He says he has repeatedly made his own winter butter at the factory, and found no difficulty in keeping it over till June, sweet and good, a firm article, both from cream churned sour and sweet. The churns used at the factories are the common one and a half barrel dash churn—and we may remark here that, notwithstanding a great many ingenious devices have been constructed for churning, the old dash churn seems to still hold its place as among the best, with butter manufacturers.

"The skim milk cheese from the Orange county factories are shipped to the West Indies and to warm climates, and command in the market a price nearly equal to the factory cheese of Oneida and Herkimer. Indeed, the quotations are sometimes higher. Mr. Slaughter writes us that the shipments of skim cheese for the week preceding October 11, brought eighteen and one-half cents per pound, while choice factory cheese, at the Little Falls market, at that time, averaged no more than seventeen and one-half to eighteen cents.

"The main difference in the manufacture of the cheese from skim milk and pure milk, is that less heat and more salt is required for the skim cheese.

"Mr. Slaughter furnishes us with the following statement of receipts and expenditures of his factory for eight months of last year, commencing with April 1, as follows:

"Quantity of milk from three hundred and eighty cows for eight months, five hundred and ninety-three thousand one hundred and thirty-seven quarts, wine measure. From this was manufactured

73,100 pounds of	cheese, which sold for	$13,383 07
31,185 "	butter	14,554 58
17,549 quarts of	milk sold	1,074 09
2,240 "	cream sold	516 40
Sundries		40 06
Hogs		1,646 83
Total		$31,215 03

EXPENDITURE.

For labor	$1,195 00	
Materials used	1,285 81	
Cost of hogs and grain fed	719 43	
		$3,200 24
Making a net profit of		$28,014 79

"From the above we arrive at the following: that the average number of quarts of milk per day from each cow for the eight months, was about six and a half, giving a net profit of a little over five cents per quart, or in the neighborhood of seventy four dollars per cow.

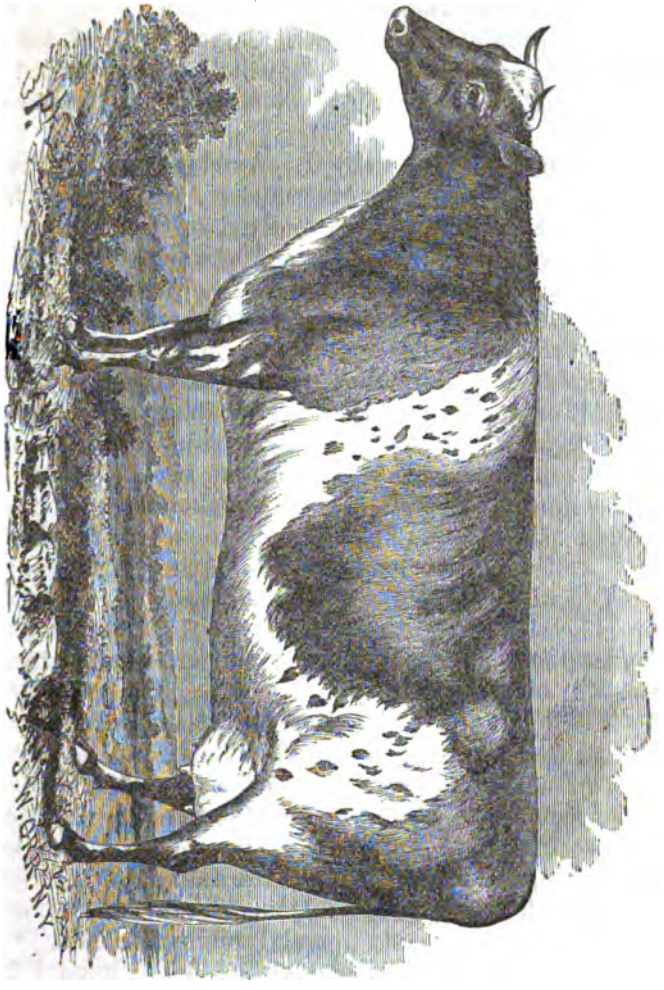
"It will be observed that the average quantity of milk daily received per cow is quite small. Doubtless only a portion of the milk from the several dairies was sent to the factory.

"We have given all the facts and figures, to show that when there is comparatively but a small number of cows, butter factories may be established under this system with a reasonable expectation of large profits.

"The manufacture of cheese in factories has now become so widely extended as to make butter scarce and high—at least butter of prime quality—and the introduction of a few butter factories in every county would be a great convenience, not only to the people at large but to dairymen. Many of our cheese dairymen depend on purchasing their butter, and are very much troubled at times in getting a supply. If they could go to a factory and obtain a prime quality at any time as wanted, they would regard it as a decided convenience.

"Again: when butter making is made a business, as at a factory of this description, skill and perfection of work would be sought, and we should have less of the miserable rancid grease so frequently sold under the name of butter. The facts presented here are worthy, it is believed, of careful consideration by our dairymen. We have no space to treat the matter farther now, but may refer to the subject again hereafter."

AYRSHIRE CATTLE.



"LADY AYR," PROPERTY OF WALCOTT & CAMPBELL.

This breed of cattle, it is presumed, is but little known in Missouri. A few very choice thorough-breds have been very recently brought into St. Louis county, where there were previously a few grades. This is all that I have any information of in the State. After the information given in previous pages in regard to them, it is necessary to add but little more.

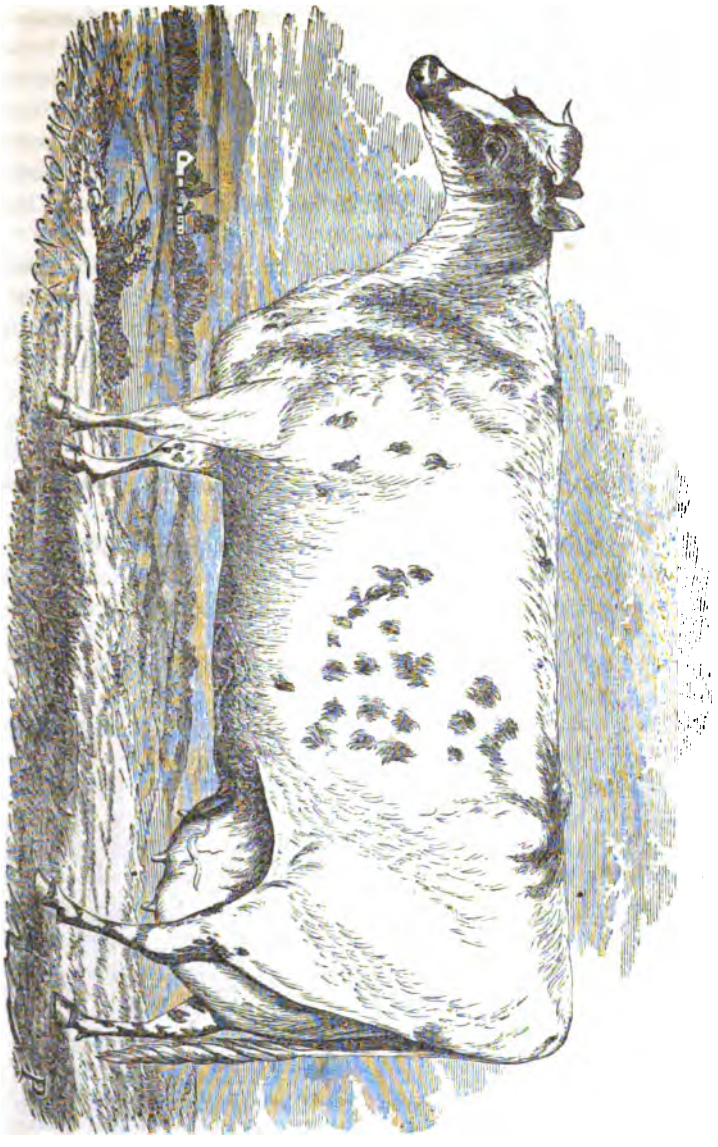
For the purpose of producing good dairy animals in Missouri, the introduction of the Ayrshires for crossing with our natives and with the Durhams, promises unquestionably the best results. They are small, compared with the Durhams; very hardy, easily kept, quiet and gentle in disposition, and well adapted to any part of Missouri, but more especially to the rougher portions of it. In proportion to the

amount of food they require, they will yield a larger quantity of good milk than any other breed. In addition to this, with their hardiness and strength of constitution, they possess such fattening tendencies as will insure a profitable return from calves fattened for veal, from steers raised for beef, and from cows, which, having served their turn in the dairy, are at last dried of their milk and prepared for the shambles.

"The following points, given by the Ayrshire Agricultural Association, in 1853, 'as indicating superior quality,' will give an idea of the standard of Ayrshire cattle as recognized by the leading breeders: 'Head short; forehead wide; nose fine, between the muzzle and the eyes; muzzle moderately large; eyes full and lively; horns widely set on, inclining upwards and curving slightly inwards; neck long and straight from the head to the top of the shoulders, free from loose skin on the under side, fine at its junction with the head, and the muscles symmetrically enlarging towards the shoulders; shoulders thin at the top; brisket light; the whole fore quarter thin in front, and gradually increasing in depth and width backwards; back short and straight; spine well defined, especially at the shoulders; short ribs, arched; the body deep at the flanks, and the milk veins well developed; pelvis long, broad and straight; hook (or hip) bones wide apart and not much overlaid with fat; thighs deep and broad; tail long and slender, and set on a level with the back; milk vessel (udder) capacious and extending well forward; hinder part broad and firmly attached to the body; the sole or under surface nearly level; the teats from two to two and a half inches in length, equal in thickness, and hanging perpendicularly; their distance apart at the sides should be equal to about one-third the length of the vessel, and across to about one-half of the breadth; legs short, the bones fine and the joints firm; skin soft and elastic, and covered with soft, close and wooly hair; the colors preferred are brown, or brown and white, the colors being distinctly defined; weight of the animal when fattened, about forty imperial stones, (that is, five hundred and sixty pounds) sinking the offal.'"*

In the month of September last I attended the annual fair of the New York State Agricultural Society, at Utica, located in the midst of the rich dairy region of that State. While there I purchased from the herd of Hon. Samuel Campbell, of the firm of Walcott & Campbell, New York Mills, several head of very fine young Ayrshires. They were bought for Leonard B. Holland, Esq., of St. Louis county, at whose place, about twelve miles west of St. Louis, they may now be seen. Among them is the beautiful two year old heifer "Betty," whose dam is the famous "Lady Ayr," represented in the cut on page 69.

* From an article by Sanford Howard, Esq., in the report of the Commissioner of Agriculture for 1863. Mr. Howard visited the county of Ayr, Scotland, for the purpose of purchasing this breed of cattle, and there gathered much information in regard to the history and characteristics of the stock, which will be found in the report named.—L. D. M.



"WHITE LILY," PROPERTY OF WALCOTT & CAMPBELL.

I trust I shall be excused for saying here, incidentally, that my visit with the gentlemanly proprietors of the New York Mills, whose kindness, affability, and whole-souled generosity is only equaled by their ability to gratify their inclinations, was too interesting and agreeable to be forgotten. The degree of systematic perfection exhibited throughout their extensive manufactories, the degree of thrift and prosperity attendant, the order, neatness and flourishing condition of the whole village, which is owned by the proprietors of the mills, was a sight worthy of all admiration. Such men as Messrs. Walcott and

Campbell, are, in the true sense of the term, *public benefactors*. While enriching themselves, they benefit the poor and the lowly, benefit the State, and justly merit and receive the gratitude and admiration of all classes, from the highest to the lowest. There is no position in life more enviable, in my mind, than that occupied by these gentlemen, except perhaps that of being a thorough and successful farmer, and this latter they have to a considerale extent added to their manufacturing enterprises.

The regretful reflection recurred that while Missouri possesses superior advantages for establishments of this kind, so conducive to wealth and prosperity, her affluent citizens have not seen the propriety of engaging therein. Eastern manufacturers visit St. Louis, buy our cotton, transport it a thousand miles in round numbers, manufacture it and send it back here to supply our wants. To be truly successful and prosperous, we should manufacture, where we have every facility for doing so, sufficient to supply our own wants, and have a surplus to send to other markets.

One of the editors of the *Country Gentleman* recently paid a visit to the New York Mills, and gave the following account of the herd of Ayrshires, and some other matters of interest to agriculturists:

VISIT TO HON. SAMUEL CAMPBELL'S, AT NEW YORK MILLS.

The New York Mills, a few miles from Utica, have long been noted for manufacturing a superior quality of bleached cotton goods. They are not surpassed, we believe, by any American manufactory.

These mills are three in number, situated along the Saquoit creek, and distant from each other some half to three-quarters of a mile. The first mill is only a mile or so above Whitesboro, at which point the stream empties into the Mohawk. Up the Saquoit valley, from Whitesboro to Cassville, there is almost one continued line of machinery, and millions of dollars are here invested in manufactories, noted all over the land for the perfection of their work. Among them the New York Mills hold a prominent place. In the vicinity of the great Central Mills is the village known as York Mills, composed mainly of houses occupied by the operatives, and owned exclusively by Messrs. Walcott & Campbell, the proprietors of the cotton mills. You may travel a long distance over the country, and nowhere find a neater, more quiet or pleasanter little village than York Mills. Everything about the village and about the mills has an air of neatness and perfection which one rarely sees elsewhere in a business of such vast proportions. On a pleasant day in October, in company with our good friend R. H. Pomeroy, of the Mohawk Valley Bank, we drove out to Mr. Campbell's to take a look at the farm, the herd of Ayrshires, and the great barn, not yet quite completed, on the flats, near the Central Mill.

Perhaps no man in Oneida county is more loved and respected than

Samuel Campbell. His strict integrity, high sense of honor and munificent charities have given him an enviable reputation, and the highly complimentary vote at the late election, which makes him State Senator for his district, indicates the esteem in which he is hold by all classes of people.

His princely residence is on high grounds, between the central and lower mills. The grounds are beautifully laid out with broad avenues, skirted with evergreens, the whole forming one of the most delightful suburban villas in this part of the State.

Here we found Mr. Campbell, and at once proceeded to the stables and fields to look over the stock. The herd of imported and thoroughbred Ayrshires embraces between thirty and forty head, and is pronounced, by competent judges, the best herd in this country. We ought, perhaps, to remark here that although Mr. Campbell is a breeder and importer of Ayrshire stock, the main object has been not so much for making sales as for pastime or a relaxation from immense business cares, together with considerations of a practical character connected with his business. The idea, we believe, of accumulating a herd first grew out of philanthropic motives. The workmen at the mills found it difficult to obtain milk, and Mr. C., ever mindful of the necessities of those in his employ, undertook to supply them with a pure article, at reasonale rates. Accustomed to do everything in the best possible manner, it seemed to him that the best stock for milking purposes and the best milk could be had from thorough-breds, or at least thorough-breds and grades raised under his own immediate supervision; and thus, in a practical way, and for purposes entirely different from those actuating the general run of those in possession of thoroughbred stock, are the public indebted for the collection of this magnificent herd.

So far as making money by stock growing, we presume it has never entered into the calculation of either Mr. Campbell or Mr. Walcott. But in having the best, and being able to send out an animal that is to improve the stock of the country, of course both must feel a just pride. We write this in justice to Mr. Campbell, who has not expected a notice at our hands, nor should we refer to this herd were it not that we feel that we are doing a real service to the public.

Some of the animals of the herd have a wide reputation and a history of their own. Thus, it may be of interest to some to know that the noted cow Ayrshire Lass is tenderly cared for, although now of little value. She is between seventeen and eighteen years years old, and Mr. Gibson, the intelligent herdsman, informed us that during the past season she gave twenty-three pounds of milk at one milking.

The imported cow Handsome Nell, which took the first premium at the State fair two years ago, is now five years old, and her clean limbs, beautiful mottled color and fine points show that she deserved it. Her record is twenty-three pounds to a milking.

White Lily gave twenty-two pounds, and Lady Ayr twenty-four

pounds. Both of them are widely known among those who have kept the run of Ayrshire stock.

The imported cow Tibby, with Highland Mary and Heather Bell, by chance stood together in the yard, and it seemed to us three more perfect and beautiful specimens of the breed could not well be brought together. Highland Mary, it will be remembered, took the first prize at our recent State fair. She is a descendant of White Lily, five years old, and sired by Kilburn. Her color is salmon, splashed with white, with fine head and horns, clean limbs, and an udder that would delight those looking for a perfect dairy cow. She is the mother of a bull calf which took first premium at the fair, and which Dr. Morse, of the Missouri State Board of Agriculture, purchased to go West.

Tibby gave twenty-five and one-half pounds at a milking. She is white and red, beautifully marked, and with a form and udder that show at once that she is a deep milker.

Lucky, Gem and Ellen Douglas, the latter five years old, and born on the sea, have all fine points—and thus we might go through with the various animals, but yet fail to give the reader a full idea of all the merits of this really select and valuable herd.

Of the two imported bulls, Baldy and Tarbolton, which were exhibited at the State fair, it would, perhaps, be needness to speak, and yet handsome and perfect as Baldly is, Tarbolton, to our mind, surpasses him. He has greatly improved since the fair, and we have never seen an Ayrshire that shows so many good points and such promise as a getter of deep milking stock.

We have already occupied so much space that we must defer speaking of the calves and the nice lot of thorough-bred heifers, the latter of which were feeding down in the great meadow on the flats—and can only advise farmers in search of models for the dairy to take a look at this herd, since we are convinced enough will be learned to pay for the journey and the time occupied.

The attention of dairymen has of late been directed to the importance of securing the best breeds of stock for dairy purposes, and those who have tried an Ayrshire strain of blood are greatly pleased with results obtained.

The main points now sought after by the dairymen are deep milking qualities, good constitution and economical feeders. The production of beef in connection with dairy farming does not generally enter into account with those purchasing stock for dairy purposes. Fair size is, with many, desired, under the impression that the larger animal, all things being equal, has capacity for producing more milk than the smaller—hence a cross of Ayrshire on the Short Horn is highly recommended by some. Breeding in this way has been practiced for a number of years by Mr. A. L. Fish, of Windfield, Herkimer county, and with the best results. In a conversation with Mr. Fish, he states that he has no difficulty in breeding very deep milkers—often carrying this quality so far that the animal produced such large

quantities of milk as to fail in constitution and break down under the tax imposed on the system.

Others, again, hold that a medium sized cow, like the Ayrshire, not only produces as much milk as the larger animal, but that much less food is required for their keep, and hence the breed is most economical for dairy purposes. Another recommendation in their favor is their activity, which adapts them to broken or uneven lands, like those composing a large share of the dairy regions. They live and thrive well upon lands unfavorable for feeding other breeds. Importations of Ayrshires into this county were made upwards of twenty years ago, but it is only of comparatively late date that they have been known here as possessing qualities to recommend their general introduction for the dairy. The origin of the breed does not seem to be definitely settled—at least writers differ in regard to their history. According to some, the Ayrshire originated in a cross of the Short Horn and Alderney; others state the stock to be derived in part from animals imported from Holland. Rawlin remarks that "it is said to be a mixture by bulls brought from the island of Alderney with their own or the old race of cows," while Martin says, "at some period or other there has evidently been a cross with the Durhams or Holderness, and perhaps also with the Alderney breed."

These statements we find in an excellent paper on the breed by Sandford Howard, Secretary of the Michigan State Board of Agriculture, who says that "the leading type of the breed was formed in part by an infusion of the blood of the Kyloe or West Highland breed." But whatever their origin, their value as a dairy stock is beyond question, and commands the attention of those seeking to improve the milking qualities of their herds. Having said this much, we cannot close without making a brief allusion to Mr. Campbell's new barn, referred to in the early part of this article, which, when completed, will be one of the best in the State.

The building is something in the form of an H, or two parallel buildings connected together by a central building forty feet by forty feet, which is to be used as a feed room. The stable is one hundred and fifty feet long by forty feet wide, and the front building eighty feet by forty-six feet. The drive floor in the center of the front is so arranged as to lead into the feed room, making a long passage-way to the stables of one hundred and twenty-one feet by thirteen feet. On either side of the drive-way in the front building are bays each forty-six feet by thirty-three and one-half feet, and so constructed that no timbers are in the way to interfere with the hay, giving, when filled solid, mows twenty feet high. Mr. Campbell believes that hay can be deposited in the mows cheaper and better by horse forks than when buildings are constructed so that the loads may be driven in at the upper story and the hay tumbled down in the mows. He says in this way the time and labor gained in unloading are, after all, not so much gain, since the hay is deposited in masses difficult to be removed for feed-

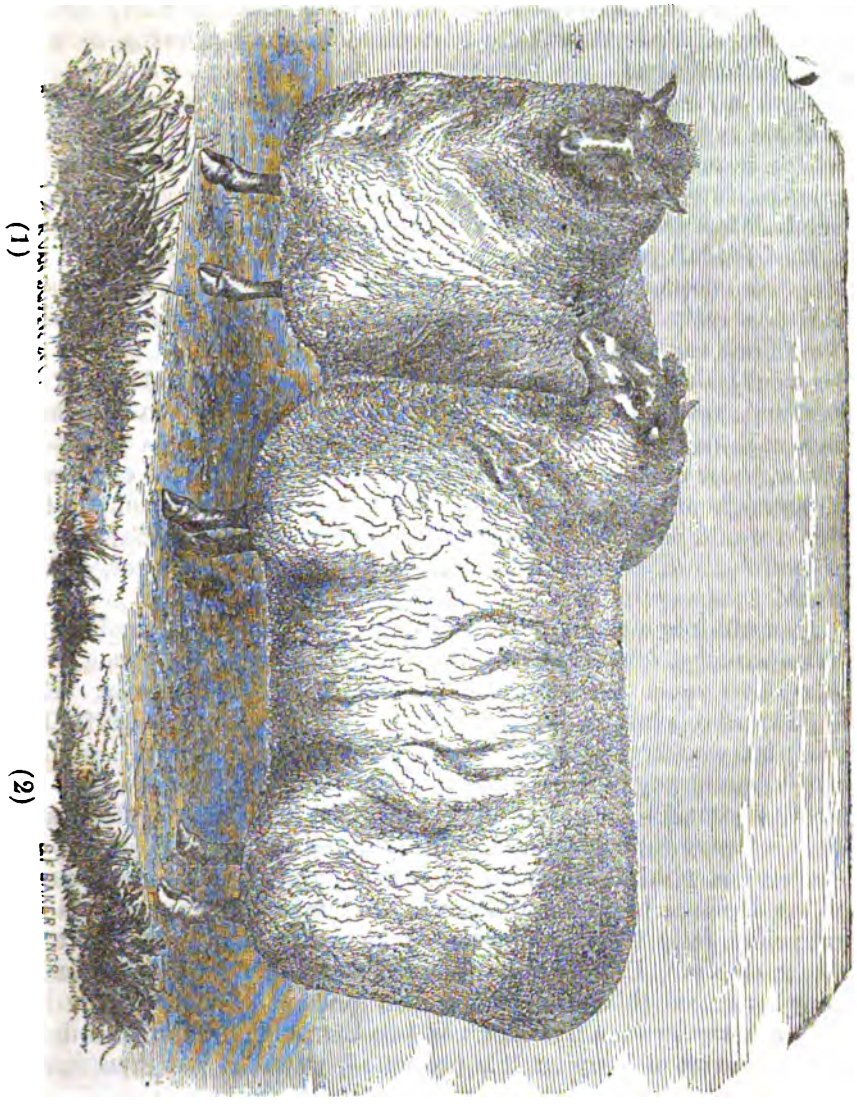
ing; but with horse forks the load can be carried to any part of the mow, and the mowing away done more perfectly and in but little less time than by the other method. The stable is made to hold about eighty head of cattle, and is to be arranged with modern fixtures for feeding —with troughs or receptacles, where each animal can at any time be watered by turning a faucet connected with the water pipes. An opening in the water boxes will be provided to convey off surplus water when the animal has taken its fill. The whole structure stands upon a very neat and substantial wall—that under the front and feed room being about ten feet high. Under this part of the building is the root cellar, where teams can drive through and deposit their loads. At the time of our visit the roots were being gathered and stored, and the estimated number of bushels grown this year was put at ten thousand—mostly turnips and sugar beets.

The barn is to be lighted with gas, Mr. Campbell believing that there was less danger by lighting in this way than by carrying lights in lanterns or lamps, after the usual way. Of course, as a convenience, nothing is superior to gas. When all the necessary machinery for cutting feed, roots, etc., and other fixtures shall have been introduced, this will be, perhaps, one of the most perfect barn structures in the State.

The Messrs. Walcott & Campbell have a large tract of land in the vicinity of their mills. We went down to the great meadow, which lay spread out with level surface, and carpeted with a rich old turf, perfectly filled with grasses.

The beautiful young Ayrshires, with now and then a thorough-bred Short Horn, were feeding upon the rich after growth, making a picture that would have delighted an artist. The young stock were as tame and playful as kittens, seemingly pleased to make the acquaintance of strangers, and courting a pat with the hand or an affectionate fondling. We went up and through the great mill, with its mammoth water wheel of peculiar construction, and of itself worth seeing. Here are collected all of those wonderful machines used in cotton manufactories, performing their work with regularity and precision, and seeming to be able to accomplish everything except speaking the English language. They had, indeed, a language of their own, but it was Greek to us, and however loud and angry they might *seem* to talk, the work we noticed went steadily on without a minute's delay, and was finished in all its parts to perfection. We should be glad to make a note of what we saw here, but our paper is already long, and space forbids.

SHEEP HUSBANDRY.



(1) Cotswold Ewe, one year old, bred by John Lane, Cirencester, England.

(2) Cotswold Ewe, one year old, bred by George Miller, Markham, Canada West.

Owned by J. J. Dodge, New Lyme, Ashtabula county, Ohio.

One of the most important interests of Missouri is wool growing and the production of mutton. Immense flocks of sheep have heretofore been kept in some parts of the State, and, it is believed, always with very satisfactory profits. This interest has been very much interfered with during the war, but the recent increased demand for and high price of wool, with the scarcity of cotton, and the high price of

mutton, owing to the comparative scarcity and high price of beef, and the growing taste for mutton, has given sheep husbandry a new impetus, and farmers have been increasing their flocks by every means in their power, and many have embarked in wool growing as a new enterprise.

With our extensive territory of low-priced lands, so large a portion of them readily susceptible of sheep grazing, with our mild climate, where, in many parts, at least, sheep may live over winter on blue grass pasture, we should be able to produce wool at a cost more than one-half less than can be done in the Eastern States.

Mr. Randall, in the *Practical Shepherd*, says: "The cost of producing wool depends upon that of keeping sheep, and this necessarily varies greatly in different situations. On the high-priced lands in New York and New England, on which sheep are now usually kept for wool growing purposes, it, under judicious systems of winter management, reaches about two dollars a head per annum. In extensive regions of the South and Southwest, it is mainly comprised in the expense of herding, salting and shearing, and where the number of sheep kept is large, it does not exceed twenty-five cents a head. But it would be more profitable in those regions to provide some kind of shelter, and give a little feed in the height of winter, and this would increase the cost to fifty cents a head."

According to a table given by Mr. Randall, medium wool has sold, on an average, for forty-two and eight-tenths cents per pound, for the thirty-five years preceding the high prices of the late war. Allowing fleeces to average five pounds each, which is low enough for Merinos, this would give two dollars and fourteen cents to the fleece, which would pay the cost of keeping anywhere, and leave the owner the lambs and manure for his profit. But in Missouri, where sheep can be kept for more than half cheaper than in New York and New England, it will be safe to calculate as a permanent thing on one-half of the fleece as profit, in addition to the lambs and manure. At present prices, fully two-thirds of the fleece can be counted as profit. Mr. Flagg, of Moro, Illinois, has a flock of five hundred French Merinos. They averaged this year over seven pounds of wool to the head. This, at sixty cents a pound, gives two thousand one hundred dollars, while the cost of keeping, it is presumed, would be less than one dollar each.

It is scarcely possible for sheep husbandry to fail in the future to be remunerative. According to good authority, the imports of unmanufactured wool to the United States has exceeded our exports, for the twenty-two years preceding the war, at the rate of more than two millions of dollars a year, and of manufactured wool at the rate of more than nineteen millions a year. There cannot be a reasonable doubt that the United States can permanently furnish its own markets with wool more cheaply than other countries can furnish it. Why, then, shall we continue to be vast importers of one of the prime necessaries

of life? In a more home point of view, why shall Missouri continue to get her supply of manufactured wool chiefly from the East, while we have the ability to grow wool so much more cheaply than it can be grown there, and have, also, every facility for manufacturing it?

Moreover, wool growing seems to be peculiarly adapted to our present circumstances and necessities. Our vast prairies can be stocked with sheep as fast as they can be obtained. On our hill lands sheep will thrive where other stock will scarcely find a living. They will aid in subduing our wild and half cultivated lands.

Mr. Randall, in his report on Fine Wool Husbandry, 1862, says: "Sheep would be more profitable than cows on a multitude of the high, thin-soiled dairy farms of New York, and every person who has kept the two animals ought to know that sheep will enrich such lands far more rapidly than cows. On the imperfectly cleared and briery lands of our grazing regions, sheep will more than pay for their annual keep for several years, merely in clearing and cleaning up the land. They effectually exterminate the blackberry (*rubus villosus et trivialis*), and raspberry (*rubus strigosus et occidentalis*), the common pests in such situations, and they banish or prevent the spread of many other troublesome shrubs or weeds. They also, unlike any other of our valuable domestic animals, exert a direct and observable influence in banishing coarse, wild, poor grasses from their pastures, and bringing in the sweeter and more nutritious ones. It was a proverb of the Spaniards, 'wherever the foot of the sheep touches, the land is turned into gold.'

"And the growth of wool is peculiarly adapted to the pecuniary means and the circumstances of a portion of our rural population. Their capital is mostly in land. Hired labor is costly. Sheep husbandry will render all their cleared land profitably productive, at a less annual expenditure for labor than any other branch of farming. By reason of the rapid increase of sheep, and the great facility of promptly improving inferior ones, they will stock a farm well, more expeditiously, and with far less outlay, than other animals. And, lastly, the ordinary processes and manipulations of sheep husbandry are simple and readily acquired. On no other domestic animal is the hazard of loss by death so small. It is as healthy and hardy as other animals, and unlike all the others, if decently managed, a good sheep can never die in the debt of man. If it dies at birth, it has consumed nothing. If it dies the first winter, its wool will pay for its consumption up to that period. If it lives to be sheared once, it brings its owner in debt to it, and if the ordinary and natural course of wool production and breeding goes on, that indebtedness will increase uniformly and with excellerating rapidity until the day of its death. If the horse or the steer die at three or four years old, or the cow before breeding, the loss is almost a total one."

By reference to the County Reports of Dallas, Lawrence and some others of Southwest Missouri, it will be seen that the price of land in

that region is remarkably low; that most of the land is well adapted to the majority of farm crops, and especially to grazing; even most of the poorest land in that section would probably make good grazing for sheep. The climate is very mild and healthful. Another eminent advantage of that region is the possession of an abundance of water power of unsurpassed excellence. The numerous large springs upon the Niangua river and other streams, afford an easily available water power. They never freeze, and are not affected by drouth or freshets. It is doubtful whether any region of the United States affords better facilities for wool growing and wool manufacturing than Southwest Missouri. It only lacks more complete connection with St. Louis, which will doubtless be accomplished at an early day by the completion of the Southwest Branch of the Pacific Railroad.

In regard to the qualities of the different breeds of sheep, and their adaptation to Missouri, considerable interest is shown in some of the county reports. This subject we have endeavored to some extent to illustrate.

The question of what breed of sheep is most desirable in individual cases, should be determined here, as everywhere else, chiefly by the situation and character of the soil. If the object is to make mutton the chief and primary consideration, and wool secondary or accessory, then the improved English mutton varieties are undoubtedly to be preferred. But, to succeed with the mutton breeds to any great extent, requires easy accessibility to the large markets where mutton is in demand. To succeed with the English Long Wools, as the Cotswold and Leicester, requires, in addition, rich, level land, sufficiently moist to produce an abundance of rank verdure throughout the summer. When all the circumstances are favorable, the mutton breeds will no doubt pay the best, but the extent to which the Long Wooled sheep are particularly adapted for profit in Missouri, it seems to me is quite limited.

The Southdowns, Shropshire Downs, etc., which are classed as Middle Wooled, or British Short Wooled sheep, are much more generally adapted to this State. Their mutton is scarcely excelled, they are hardy, good workers, and better adapted than the Long Wools to our upland pasturage. In the latter respect, however, especially where pasturage is scanty or dried up, none of the English mutton breeds can compare with the Merino. From an observation of their habits and tastes, it has been inferred that the Merino requires short verdure, and a considerable variety of it. I have been among the Merino flocks of Vermont sufficiently to verify the statement of Mr. Randall, that "where they have an opportunity to choose, they will invariably desert the rich valley a considerable portion of each day, to climb the lofty hillside, and they love to clamber about its steep declivities and among rocks, to crop the scattered tufts of grass, and browse on those bushes and weeds which they are fond of mingling with their food."

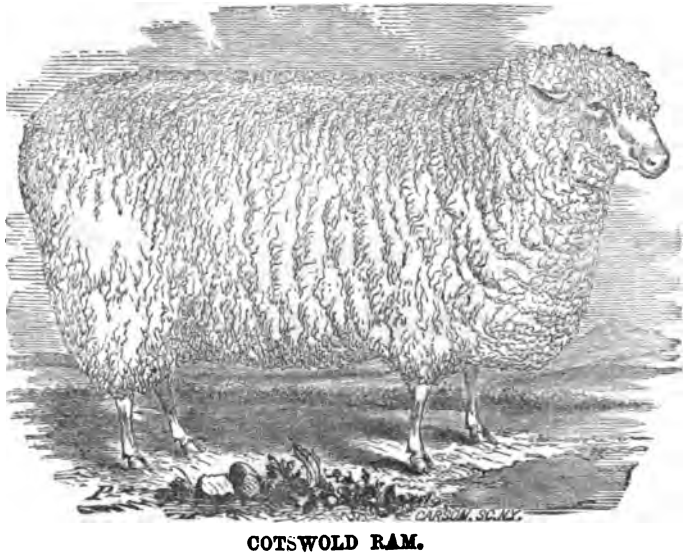
On the timbered and more less rocky hills of Missouri, the Merino

is emphatically *the* breed to encourage. At a distance from meat market, and wherever the production of wool is the leading object, and mutton only accessory, it is believed that the Merino has no competitor. I do not quite concur in the opinion of Judge Caldwell, of Clark county, when he says, "the sheep are too tender for our climate, require too much housing and attention during winter, and do not, as a general thing, remunerate for the trouble expended, in the same ratio as our own mongrel breed." They are hardy enough for the frigid region of Vermont; then why not for the much milder climate of Clark county? It may be that the cold, freezing rains of the latter are more severe on them than the greater degree of dryer cold of Vermont. They need shelter, but will they not pay amply for it? I think when well kept they will yield an average about one-third more wool per head than the mongrels, and it is worth fully ten cents more per pound. Then, if the mongrel fleece weighs four pounds, and is worth fifty cents per pound, and the Merino fleece weigh six pounds, worth sixty cents per pound, it will make a difference of one dollar and sixty cents per head in favor of the Merino. This would amount to eight hundred dollars annually on five hundred sheep. If this estimate is correct, the difference is surely enough to doubly pay the trouble and expense of housing and attention. If the object is to raise mutton, the case would be different.

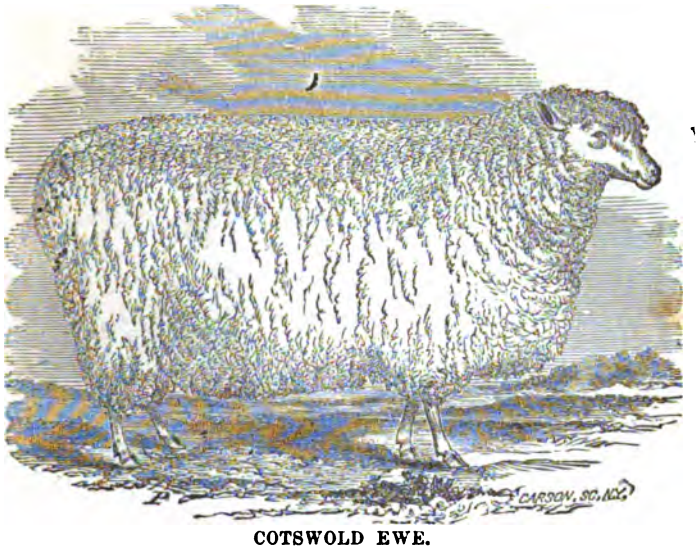
LEICESTER RAM.

LEICESTER EWE.

The accompanying cuts are from drawings of a pair of Leicesters, imported by Mr. Samuel Campbell, of New York Mills, Oneida county, New York, and Mr. James Brodie, of Rural Hill, Jefferson county, New York. They were imported in the spring of 1861. The ram was bred by Mr. Simpson, and the ewe by John Thomas Robinson, both of Yorkshire, England. The ram weighs two hundred and seventy-six pounds. Messrs. Campbell and Brodie's ewes weigh from two hundred pounds to two hundred and fifty pounds. Their yearlings and wethers yield from ten to fifteen pounds of wool, and their breeding ewes about eight pounds.



COTSWOLD RAM.

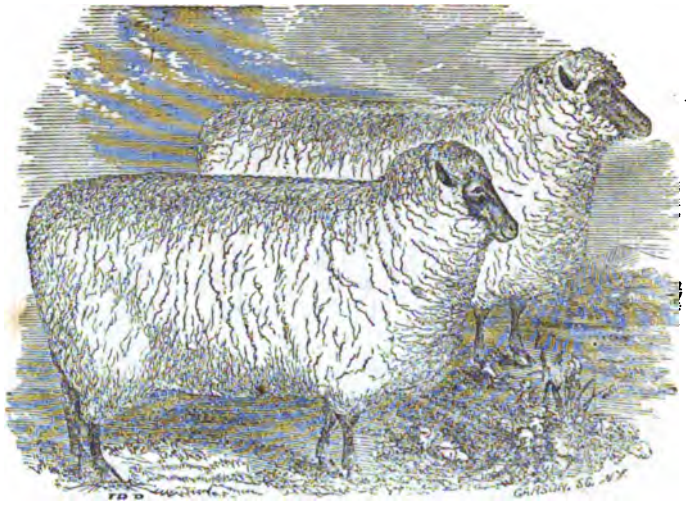


COTSWOLD EWE.

"Pilgrim," the ram, of which a cut is given on the preceding page, was bred by Mr. Frederick Wm. Stone, of Moreton Lodge, Guelph, Canada West, and is now the property of Mr. Henry G. White, of South Framingham, Massachusetts. "Pilgrim," just off his winter feed, weighs two hundred and fifty pounds. He would weigh considerably more in the fall. He yielded eighteen pounds of wool in 1862.

The ewe, "Lady Gay," a portrait of which is given, was also bred by Mr. Stone, and is owned by Mr. White. She weighs two hundred pounds, suckling a lamb. She yielded sixteen pounds of wool in 1862. "Pilgrim" and five ewes belonging to Mr. White, yielded an average of sixteen pound of wool per head.

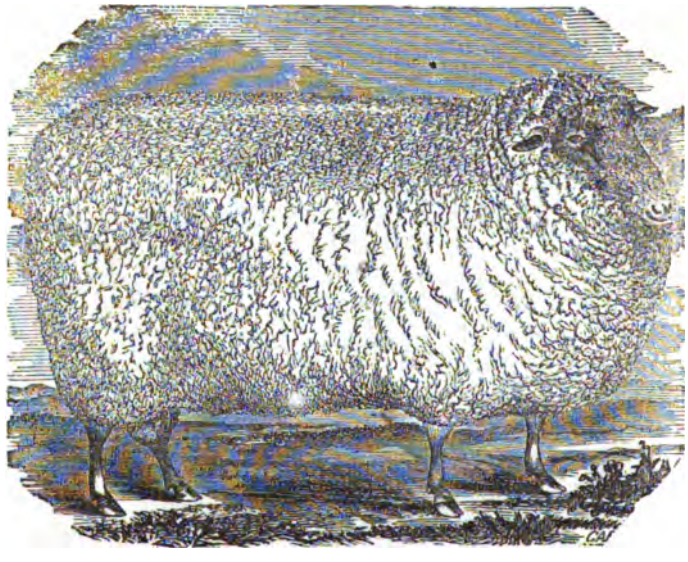
SOUTHDOWN RAM.



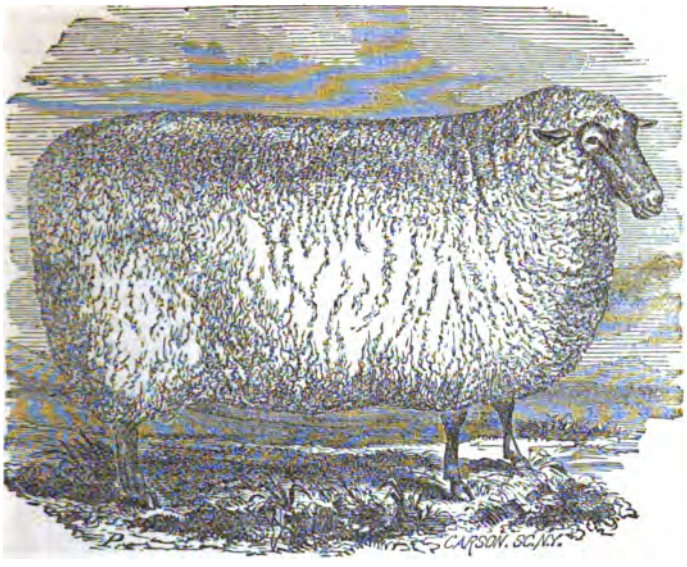
SOUTHDOWN EWES.

The ram, a cut of which is given on the preceding page, is "Archbishop," bred by Mr. Jonas Webb, of Babraham, Cambridgeshire, England, and owned by Mr. Thorne, of New York.

The ewes, cuts of which are given on this page, are a pair of two-year olds, bred by Mr. Thorne, from his imported stock. The yield of wool from the Southdowns varies from six to twelve pounds per head.



SHROPSHIRE DOWN RAM.



SHROPSHIRE DOWN EWE.

The two animals represented in the foregoing cuts are owned by Hon. N. L. Chaffer, of Jefferson, Ashtabula county, Ohio. The ram, "Lion," now three years old, was bred by Lord Berwick, of Shrewsbury, England, and imported in 1861. His live weight is three hundred and thirty-four pounds, and he yielded, on the 16th of May, 1863, seventeen pounds five ounces of washed wool of eleven and a half months growth.

The ewe, "Nancy," was bred by Lord Berwick, and imported at the same time. She is three years old, and her live weight is two hundred and forty-one pounds. On the 16th day of May, 1863, she yielded nine pounds three ounces of washed wool of eleven and a half months growth. Six ewes, at the same time and under the same circumstances, yielded forty-two pounds five ounces of wool. They were sheared the fifth day after washing in clear brook water.

The foregoing cuts and descriptions are from *Randall's Practical Shepherd*, published by D. D. T. Moore, Rochester, New York, a work that should be in the hands of every sheep owner.

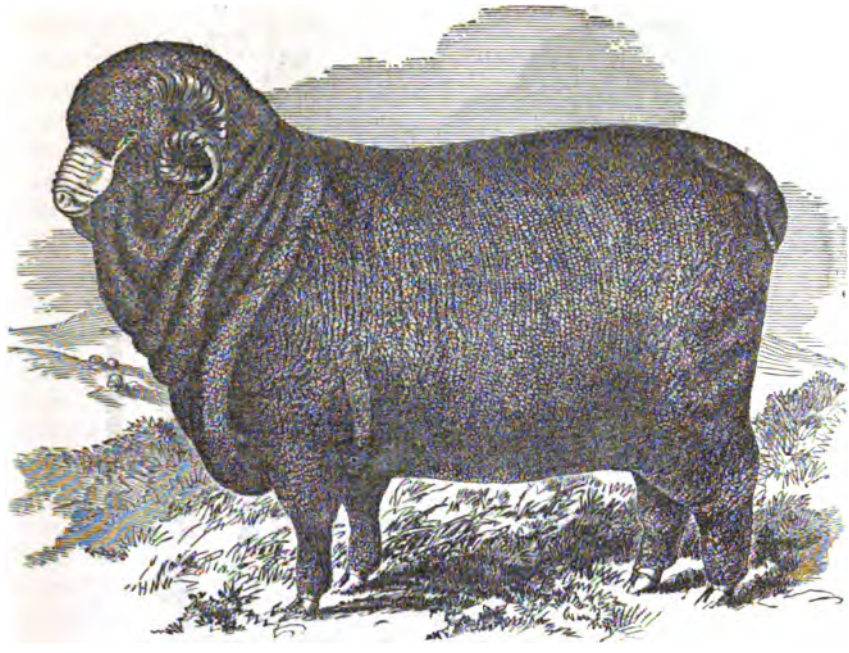
THE AMERICAN MERINO. This is now considered by the best authorities as an established variety. It is chiefly composed of two prominent families, the Infantado, or Atwood Merino, and the Paular, or Rich Merino. Of the Infantado family, Mr. Edwin Hammond, of Middlebury, Vermont, has been the leading improver. Mr. Randall says: "Mr. Hammond's sheep exhibit no hardened yolk within the wool and but *little* externally; in nearly all of them the curves of the wool can be traced to its outer tips. They are dark colored, because they have abundance of liquid 'circulating' yolk, and because they (like all the leading breeding flocks of Vermont) are housed, not only in winter,

but from summer rain storms. The great weight is made up not by the extra amount of yolk, but by the extra length and thickness of *every part* of the fleece. In many instances it is nearly as long and thick on the belly, legs,* forehead, cheeks, etc., as on the back and sides. The wool opens freely and with a good lustre and style. It is of a high medium quality, and remarkably even. Mr. Hammond is intentionally breeding it back to the buff tinge of the original Spanish wool. He has not specially cultivated folds in the skin. Sweepstakes has more of these than most of his predecessors, and has much increased them in the flock. Some of his best ewes are nearly without them, though all perhaps have dewlaps and the 'cross' on the brisket. In every respect this eminent breeder has directed his whole attention to solid value, and has never sacrificed a particle of it to attain either points of no value or of less value. He has bred exclusively from Mr. Atwood's stock, sire and dam, and since the rams originally purchased of Mr. Atwood by himself and associates, has only used rams of his own flock. The marked extent of his in-and-in breeding will be adverted to in the chapter which I shall devote to the general subject of in-and-in breeding. But this has not developed any delicacy of constitution in his flock. They are every way stronger and more robust sheep than their predecessors of twenty-five years ago, bring forth larger and stronger lambs and are far better breeders and nurses."

Of the improved Paulars, the same authority says: "In 1842 and 1843, this flock was bred to a Jarvis ram, peculiarly dark, thick and heavy fleeced, and compact in form for one of his family, the object of Mr. Rich being to avoid breeding in-and-in and to improve the quality of his wool. For the same object, and to increase the yolkiness of the wool, a dip or two of Atwood blood has since been taken; but it has always been made a point to *breed back* after taking these crosses, so as essentially to preserve the blood and distinctive characteristics of the original family. The Messrs. Rich have succeeded in all these objects, and have kept up well with the rapid current of modern improvement. Their sheep are not so large, nor do they yield so much wool per head as the improved Infantados, but they possess symmetrical forms, which are remarkable for compactness. The body is shortish, and very thick, with their ancient good fore and hind-quarters; and their heads, though thick and short, have lost their coarseness. Their fleeces are even and good; but that merit which gives them their great popularity in Vermont and elsewhere, is their adaptation to thin, scant herbage, and to their qualities as 'working flocks.' They demand no extra care or keep to develop their qualities; are alwas lively and alert, and, though gentle and perfectly free from restlessness of temperament, they are ready to rove far and near to obtain their food. And for all they consume they make the most ample returns. While they will pay for care, they will thrive with but little

* I do not mean to be understood that it is thus long below the knees and hocks, though it is generally quite as long as *it ought to be* on the shanks.

care. In a word, they remain, par excellence, the negligent farmer's sheep."



MR. HAMMOND'S "GOLD DROP."

Mr. Randall thinks that the American Merino wool exceeds all other merino wools in length. He gives in detail the measurement of a number of specimens, of about a year's growth, from different flocks. They were measured, lying naturally on paper, without a particle of stretching, and varied in length from two and a half inches to three and a half inches. He says of them: "The recent Vermont specimens above given are fairer tests of the length of the longer stapled American Merino wool, from the fact that they were not sent in any case as specimens of mere length, but of fleeces of extraordinary weight."

The preceding cut, from a drawing by Page, represents the favorite Infantado stock ram of Edwin Hammond, of Middlebury, Vermont. Mr. Hammond has refused ten thousand dollars for him. He was dropped in 1861, and was out of Old Queen, by California, by Sweepstakes, by Little Wrinkly, by Old Wrinkly, by Old Greasy, etc., etc. Old Queen was out of Old Queen's dam, by Long Wool, by Old Greasy, by Wooster, etc. His entire pedigree will be found at page 121 of the Practical Shepherd.

MR. THORP'S EWE, "KATE."

The above cut and description, as well as the following cuts and descriptions of sheep, are from the *Rural New Yorker*, published at Rochester, New York, the "Sheep Husbandry" department of which is edited by Henry S. Randall, L. L. D.

Henry Thorp, of Charlotte, Vermont, writes, March, 1865: "My ewe, Kate, (represented in the accompanying cut,) was bred by Victor Wright, of Middlebury, from his pure Infantado stock. She is three years old, and her last two fleeces have weighed, respectively, twelve and a quarter and twelve pounds. My flock numbers thirty-seven breeding ewes, all pure Infantados, and most of them purchased of Victor Wright within the last three years—but a few of them of Henry W. Hammond, of Middlebury. My sheep average not far from ten pounds of wool per head—a little over for the last two seasons, all being ewes but one. My flock being small and well cared for, shear here heavy fleeces."

THE AMERICAN MERINOS AT THE INTERNATIONAL EXHIBITION OF 1863.

Mr. George Campbell, of West Westminster, Vermont, took Ameri-

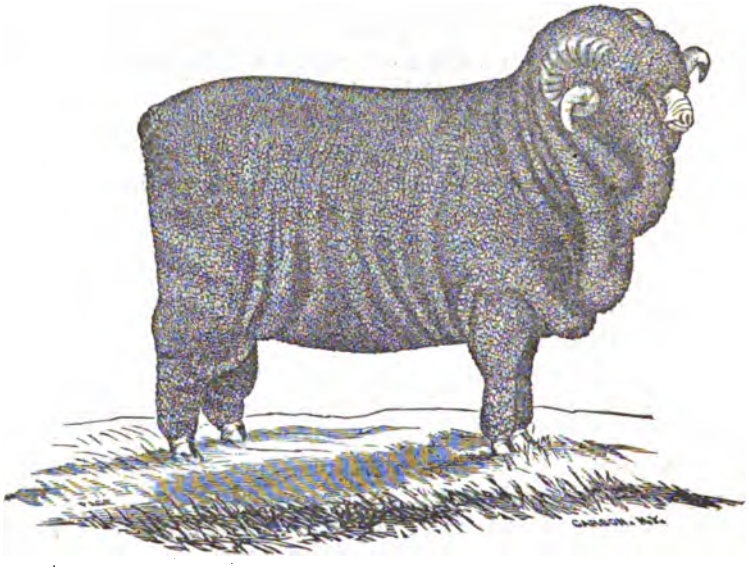
can Merino Sheep to exhibit at the International Exhibition at Hamburg, in July, 1863. He found, as reported, one thousand seven hundred and sixty-one sheep on exhibition; three hundred and fifty of them were competing in the same class with his own. They were from the Austrian, Prussian and other States of Germany, and from France. Among the French sheep competing, were about sixty belonging to the Emperor Napoleon. Mr. Campbell was awarded the first prize of fifty thalers for the best ram; the second prize of twenty-five thalers for the second best ram, and the first prize of fifty thalers for the best ewes.

The following account of the proceedings at Hamburg, is given in the Practical Shepherd, on the authority, as it is understood, of the commissioner from Vermont, Colonel Needham:

"The Committee of Award consisted of eighteen noblemen and gentlemen. The examinations were made by sub-committees, whose preliminary reports were subject to the revision of the general committee. The American sheep had encountered a certain degree of prejudice from their first arrival. The breeders of the old world, and particularly of Germany, seemed to think it audacious that Americans, who had so often imported sheep from Germany, should now enter the lists as competitors against them. And when a rumor began to gain ground that the sub-committee were disposed to award one, and then first two prizes to the American Merinos, it caused loud expressions of dissatisfaction, which were promptly re-echoed in the German newspapers. Notwithstanding, and in defiance of all this, the general committee, with manly independence, ratified the action of the sub-committee by a unanimous vote. On the official promulgation of the decision, the previous censures took the form of accusations. It was asserted that the committee had been unduly influenced. Thereupon, Colonel Daniel Needham, Corresponding Secretary of the Vermont State Agricultural Society, who was present at the exhibition as the commissioner of the State of Vermont, after conferring with the United States Commissioner, Governor Wright, and Mr. Campbell, published a card in the German tongue, proposing a sweepstakes, open to all the previous competitors, the award to be made by *a new committee*, to be selected by the German Association, under whose auspices and direction the International Exhibition took place. Colonel Needham's proposal was, that each competitor pay an entrance fee of ten dollars, and if there were less than ten entries, he offered himself to make up the prize to one hundred dollars. The offer (substantially a challenge to a new trial) was posted and circulated among all the competitors. Mr. Campbell immediately entered his sheep, *but his was the only entry!* This rendered the triumph of the American Merinos absolute and undeniable; and the press and public, with that hearty honesty which always marks the German national character, did ample justice to the Americans and the American sheep. Mr. Campbell sold his prize sheep, twelve in number, to a Prussian nobleman, for five thousand dollars. The highest priced foreign Merinos

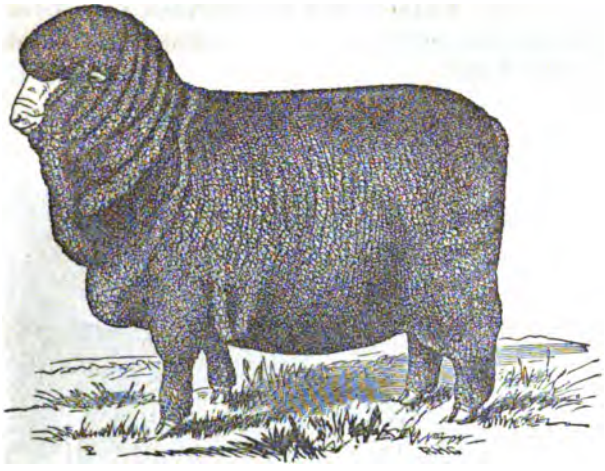
sold at the exhibition fetched but forty pounds, or two hundred dollars." It is further stated that the victorious exhibiter at Hamburg, with great fairness, signified on all occasions to the breeders of Germany and France, that he was not the founder or leading breeder of that class of American Merinos represented by his sheep, but that this honor belonged to Mr. Hammond.

MESSRS. RICH'S PAULARS.



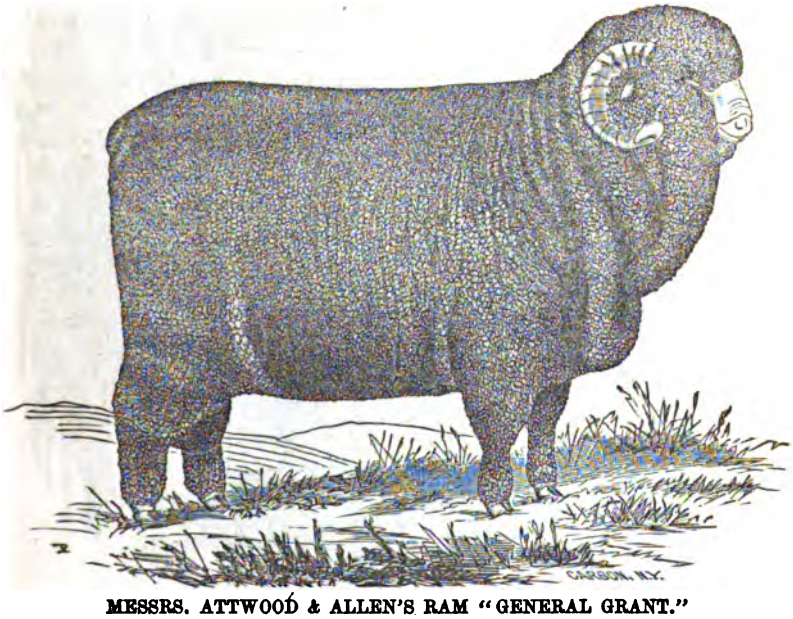
"MOUNTAINEER."

Messrs. J. T. and V. Rich's Paular ram "Mountaineer" was dropped in April, 1863. He was got by "Tottingham ram" by "Lute Robinson ram," by "Old Robinson ram," etc., etc. The dam of "Mountaineer" was a favorite ewe of the Messrs. Rich, bred by them from their old Paular stock. His first fleece weighed seventeen pounds and a quarter. Weight of carcase, after shearing, one hundred and one pounds.



"DAISY."

"Daisy," three years old, bred and owned by the same gentlemen, exhibits the characteristic form of a first class Paular ewe.

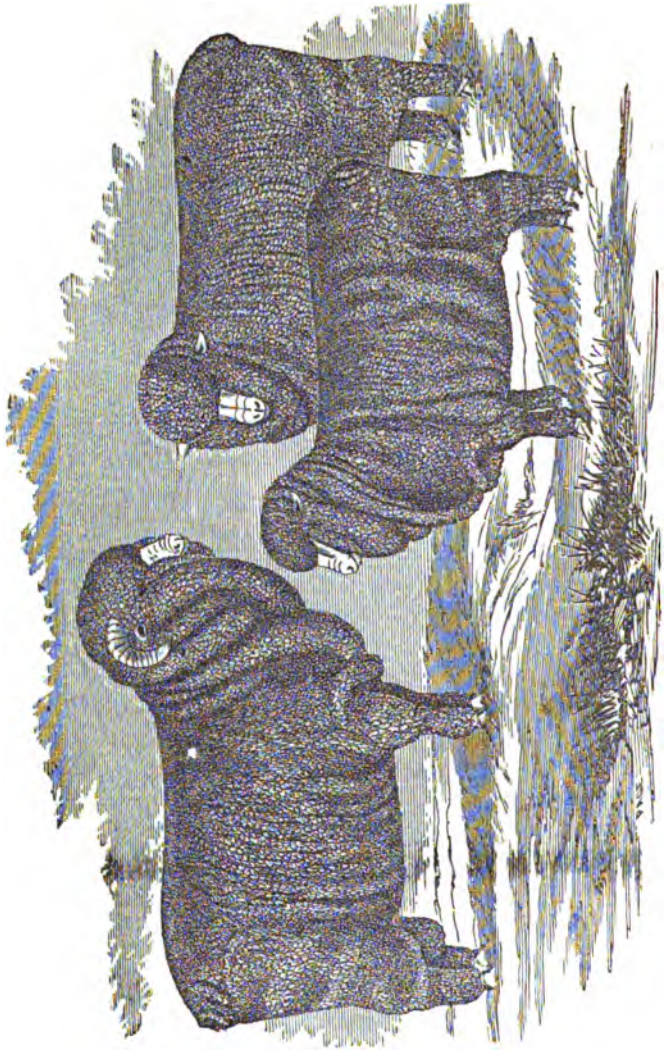


MESSRS. ATTWOOD & ALLEN'S RAM "GENERAL GRANT."

"The ram 'General Grant' was bred by D. Cutting, of Richville, Vermont, and was got by his ram 'Monitor' out a ewe purchased of Prosper Elitharp. 'Monitor' was got by Victor Wright's 'California,' etc., etc. 'General Grant' was exhibited at the Cayuga County Fair, in 1864, and took the first prize as yearling. At the Sheep Shearing in the same county in 1865, he received the first prize as a two year old. His fleece, on the latter occasion, being one year and four days

old, weighed fifteen pounds, and his carcase eighty-three pounds. For about two months previously he had been out of condition, and his wool was dried up."

MR. THOMAS' SHEEP.

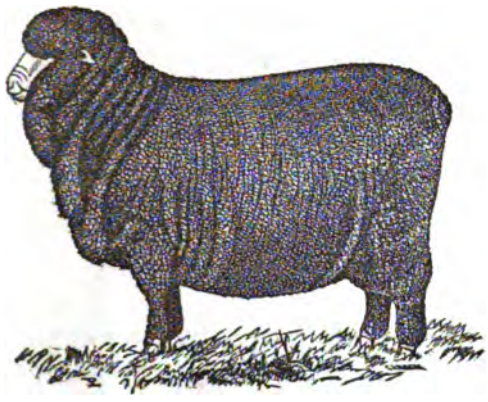


GROUP OF FINE WOOLED SHEEP OWNED BY J. H. THOMAS, ORWELL, VERMONT.

Mr. J. H. Thomas, of Orwell, Addison county, Vermont, says: "I first started my flock by purchasing, from time to time, of J. T. and V. Rich twenty-six Paular ewes of their breeding, and I have no others, except those I have bred myself from that stock. I have bred a few ewes to Infantado rams, as experiments, but as a rule I have bred to Paular rams.

"The ram teg, of which Mr. Page took the drawing (the cut of which

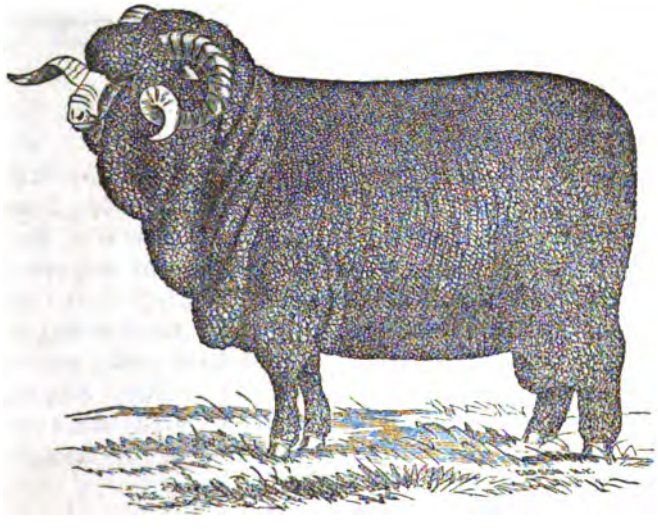
accompanies this), was got by Mr. Hammond's 'Gold Drop' out of a ewe bred by the Messrs. Rich, and got by the 'Tottingham ram.' The four year old ewe (in the rear) is a pure Rich ewe, and so is the ewe teg (in the front) got by the 'Tottingham ram.'"



MR. BURGESS' "LITTLE QUEEN."

Loan J. Burgess, North Hoosick, New York, says: "'Little Queen,' now four years old, was bred by J. T. and V. Rich, Richville, Vermont, and sold by them to J. L. Buttolph, of whom I purchased her. She was got by Mr. Hammond's 'Sweepstakes,' out of a pure Rich ewe, and is consequently half Infantado and half Improved Paular. Her four fleeces have weighed, unwashed, fifty-three pounds; she has dropped four lambs and raised three of them—bringing this year twins by Percy and Burgess' 'Gold Mine.' She received the first premium at the New York State Fair, in 1864, and was dam of the ram lamb which received the first premium at the State Fair, and which I sold on the ground for eight hundred dollars."

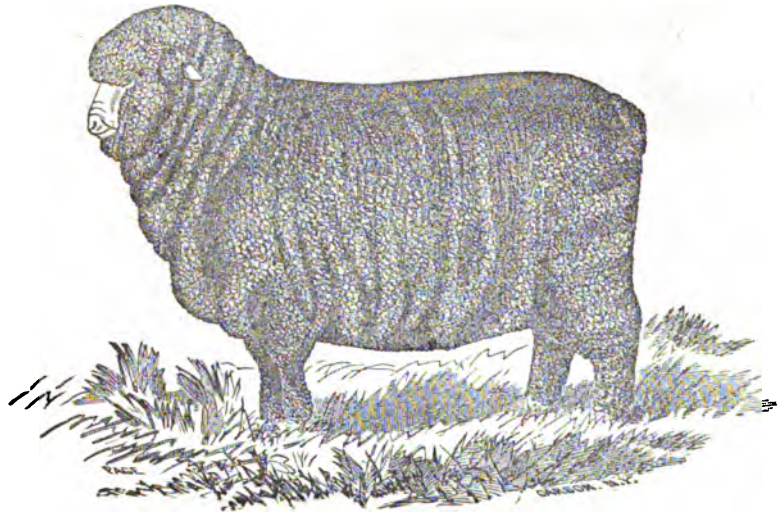
MR. POTTLE'S SHEEP.



"FRANK."

Honorable E. B. Pottle, Naples, Ontario county, New York, says: "The seven year old ram 'Frank,' now owned by myself and I. S.

Goodrich, of Lima, New York, was bought by me when a lamb, and was bred by Edgar Sanford, of West Cornwall, Vermont. He was out of one of his best ewes, by the 'Treadway and Sanford ram,' bred by Edwin Hammond. The last named ram was got by Mr. Hammond's 'Wrinkly.' 'Frank' is compactly built, very short in the leg, and weighs, when in condition, one hundred and fifty-five pounds. His wool is exceedingly well set on, his highest weight of fleece of twelve months' growth being twenty-five pounds—average weight of four consecutive fleeces, twenty-two and one-half pounds. He is well known in Western New York as a stock ram. In his prime he was, taking all his points together, entitled to rank among the best specimens of American Merinos in New York.



"BELLE."

"'Belle,' owned by me, now two years old, was bred by R. J. Jones, West Cornwall, Vermont. She was got, I learn from Mr. Jones, by a ram owned by Simon Rockwell, purchased by him of Wm. R. Sanford, and got by Sanford's 'Comet.' 'Belle's' dam was a pure Atwood ewe, purchased by Mr. Jones of Reuben P. Hall and C. B. Cook. She received the first prize at the Ontario county fair last fall, and was one of a pen of five that received the highest prize, and also the sweepstakes prize at the New York State fair in May. She was shorn at the latter, and her fleece weighed fourteen pounds and two ounces. She is a pure Infantado, and bids fair to take rank among the best American Merinos.

"ONTARIO."

"My ram 'Ontario,' one year old last spring, was also bred by Mr. Jones. He was got by his ram 'Seville,' he by William R. Sanford's 'Comet,' he by Wright's 'California,' he by Hammond's 'Long Wool.' 'Ontario's' dam was a pure Infantado ewe, got by the 'Cross Ram.' The last won the first prize at the Vermont State fair, and also at the United States fair. For his pedigree, see pedigrees of Wm. R. Sanford's sheep, in *Rural New Yorker*, last year. 'Ontario' received the first prize in his class at the New York State sheep fair in May. The cut shows him as he appeared a teg last February."

IMPROVED IMPLEMENTS.

In no department of agricultural affairs has there been so great and important improvements as in that of labor-saving machinery. There are plenty of old fogy croakers who are always ready to ridicule agricultural papers, agricultural associations, or any other means for agricultural improvement; who act virtually upon the assumption that farming, unlike any other human employment, was brought to perfection long years ago, but who, nevertheless, are forced into the adoption of the modern labor-saving implements. They are sure never to take any advanced or premature step in this direction; but after their more progressive and enterprising neighbors have used such implements before their eyes, until they can no longer be blind to the fact that they must either adopt the innovations or fall behind their neighbors in their gains and in the march of improvement, they yield, with apparent reluctance and many forebodings, to the encroachments of the "new fangled notions."

If we were now obliged to follow the pursuit of agriculture with the same implements in use twenty years ago, our productions would probably fall far short of supplying the demand. Now we behold the automaton machine, which will plant its twenty acres of corn per day, dropping the seed at the regular desired intervals, and

covering it at an equal depth. Then it is followed by the Sulky cultivator, which will go over nearly the same area of ground per day, almost without human labor, cutting down the weeds as they appear, mellowing the surface and allowing free scope to the cereal blade.

We have the wheat drill, which deposits the seed in regular lines, at the proper depth, so that each good seed will germinate under the most favorable conditions, and may be accompanied, if desirable, by nourishment suited to its earliest development. Then we have the iron reaper, with its keen, swift sickle edge, before whose radical progress the grain bends and falls for preservation when ripened by the suns of summer. Lastly, behold the horse or steam-driven flail, which at once lashes the grain from its retreat and assorts it for use. These are a few typical forms, sufficient to suggest the part played by machinery in the great work of food production. While the rural districts have in various ways been drained of their population, machinery has enabled us to effect the solution of an economic problem, and keep the supply of food up to the demand. In a savage state, one man can barely obtain enough from the soil for the supply of his own wants and those of his family. We have arrived at a state of civilization, by the use of machinery, which enables us to multiply our force without increasing consumption, so that the labor of one man suffices to supply the wants of about four; and thus, while one is retained in the field, three are sent to the towns to engage in other arts and callings which tend to increase the national wealth and better supply the demands of the whole population.

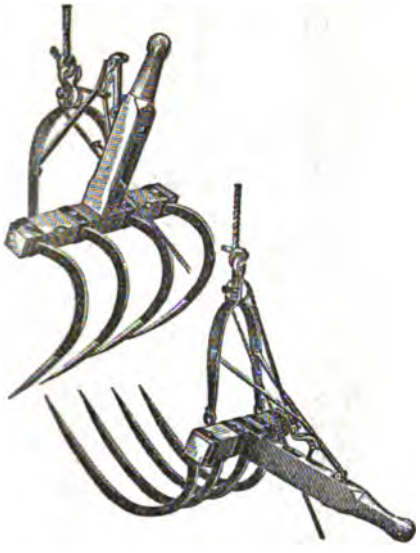
The results of human skill in various departments, splendid and beautiful as they are, are greatly due to the improved implements of husbandry. There is a more direct relationship between the delicate tissues of the loom, or the ennobling works of art, and the farmer's rotary spader or wheeled cultivator, or steam-driven threshing machine, than is generally seen or considered.

Since the unprecedented drain upon the rural population to meet the necessities of the late war, labor-saving machinery has been more than ever in demand. The *cuteness* of the ever ingenious "Yankee" has been taxed to the utmost, and to good purpose. Some of the most valuable achievements in labor-saving implements for the farmer have been accomplished since the beginning of the war, and never were they more needed or more readily appreciated.

I am informed by Plant & Brother, who have been dealers in agricultural implements in St. Louis for the last twenty years, that the demand for improved farming implements in Missouri within the last two years has greatly exceeded that of any other period, and, in some instances, exceeded the supply.

The following cuts of implements are introduced for tho purpose of bringing to the more general notice of the farmers of Missouri

some of the recent achievements for the saving of labor and the perfection of work, and also to bring to the notice of new settlers in the State such implements as have been well tried here, proved successful and found adapted to our wants.



PALMER'S EXCELSIOR HORSE HAY HOISTING FORK.

PALMER'S EXCELSIOR REVOLVING HAY STACKER OR DERRICK.

It is upward of twenty years since a fork for unloading hay by horse power was used in this country. The implement has, however, undergone various modifications, and, in some of the forms in which it is now made, is superior to the kind first invented. Palmer's, here represented, has been extensively used, and receives general commendation. A general idea in regard to the manner in which these forks are made, and the way in which they are used, may be obtained from the cuts. One of the figures represents the mode of using the fork in stacking hay, and the others show the form of the fork and its position when loaded and when discharged. The manufacturers, in their descriptive advertisement, say:

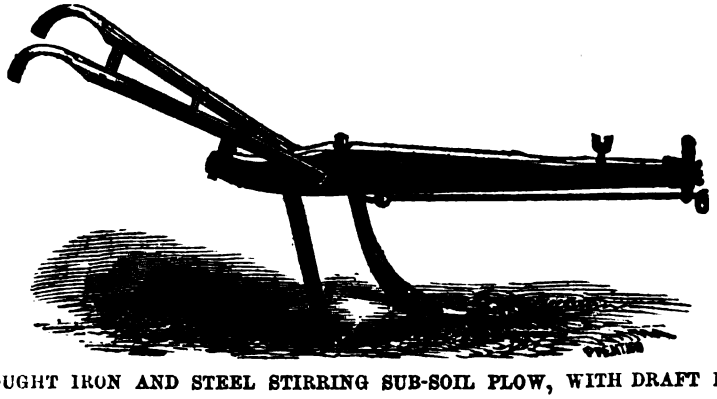
"With the pulleys furnished with the fork, it can be rigged to deposit the hay in any part of the mow, by simply pulling a small cord. It is equally adapted for stacking. The handle being short, is out of the way in going over and under the beams, through windows, etc. The bale and brace being made of *wrought iron*, and the tines of *steel*, and *sickle-shaped*, it is very strong and durable, and will hold as much as a horse can draw. The bale folding to the handle when the hay is discharged, it occupies less room to work it than any other. The head of this fork is protected by our patent self-tightening bands, through which the tines pass, making it impossible to break. Although very strong, it is small and compact, and can be used by a

boy. It will take off a load of hay, ordinarily, in three to six minutes."

METALLIC SPRING TOOTH SULKY HORSE HAY RAKE.

8-foot heads, 16 and 20 teeth.

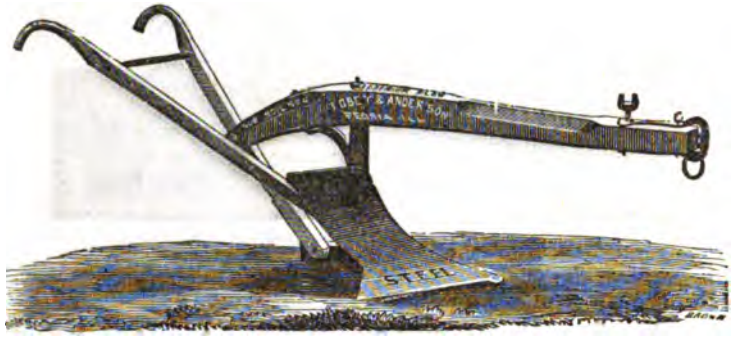
The above rake has been well tested East and West, and given good satisfaction. It seems to be about all that can be desired in a horse hay rake.



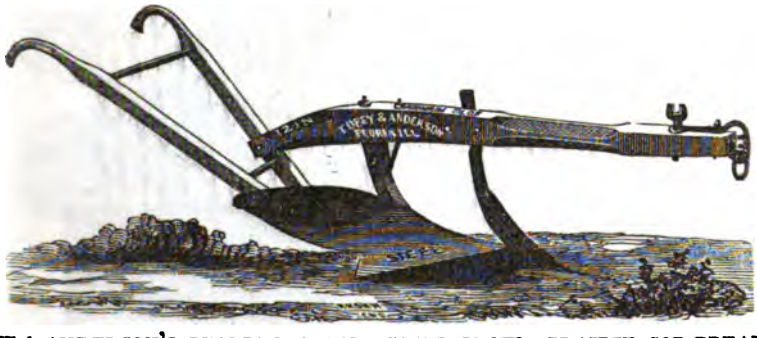
WROUGHT IRON AND STEEL STIRRING SUB-SOIL PLOW, WITH DRAFT ROD.

The above plow is made of wrought iron and steel, with the wing or share on both sides. They can be sharpened or new laid by any good

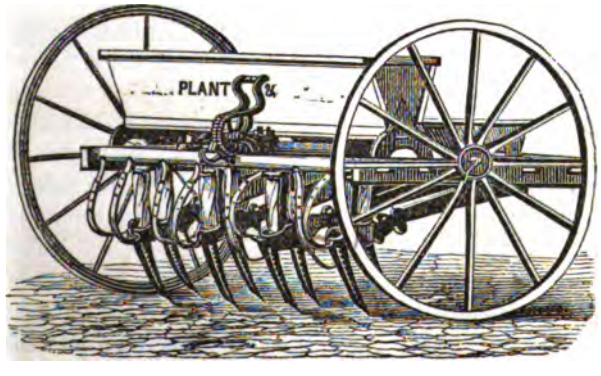
blacksmith. An improvement has lately been added not shown in the cut, by which the sub-soil is more effectually stirred. It is said that it has been found to nearly double a *sod* corn crop, by passing after the sod plow in first breaking prairie, as it loosens the unturned soil and allows the roots to spread more freely. For spring sub-soiling this plow is perhaps preferable to any other, but for fall use, or where it is desirable to throw a portion of the sub-soil up to the surface, the following is preferred:



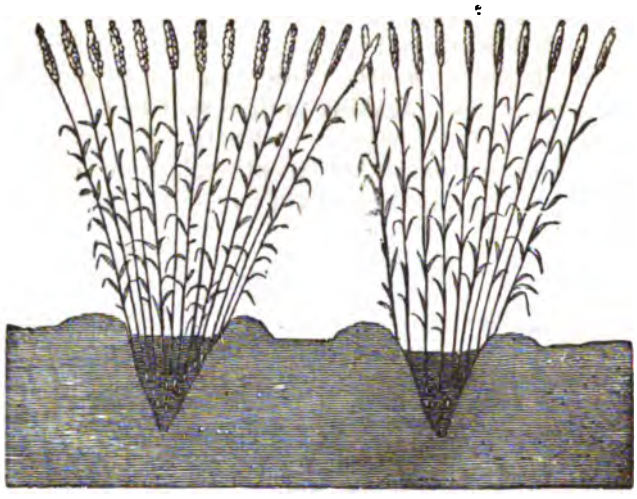
TOBEY & ANDERSON'S PEORIA PREMIUM STEEL LIFTING SUB-SOIL PLOW.



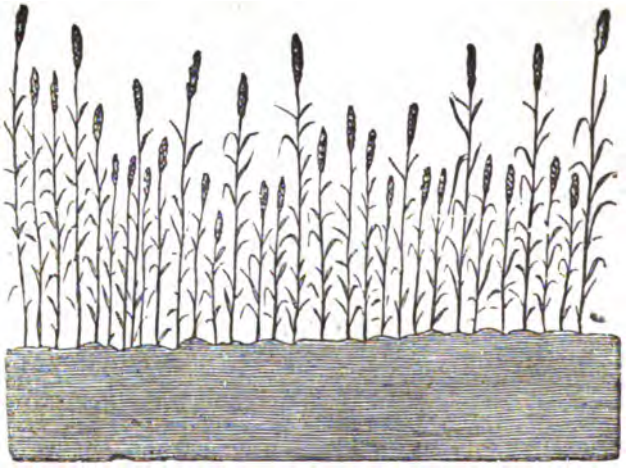
TOBEY & ANDERSON'S PEORIA PREMIUM STEEL PLOW—PRAIRIE SOD-BREAKERS.



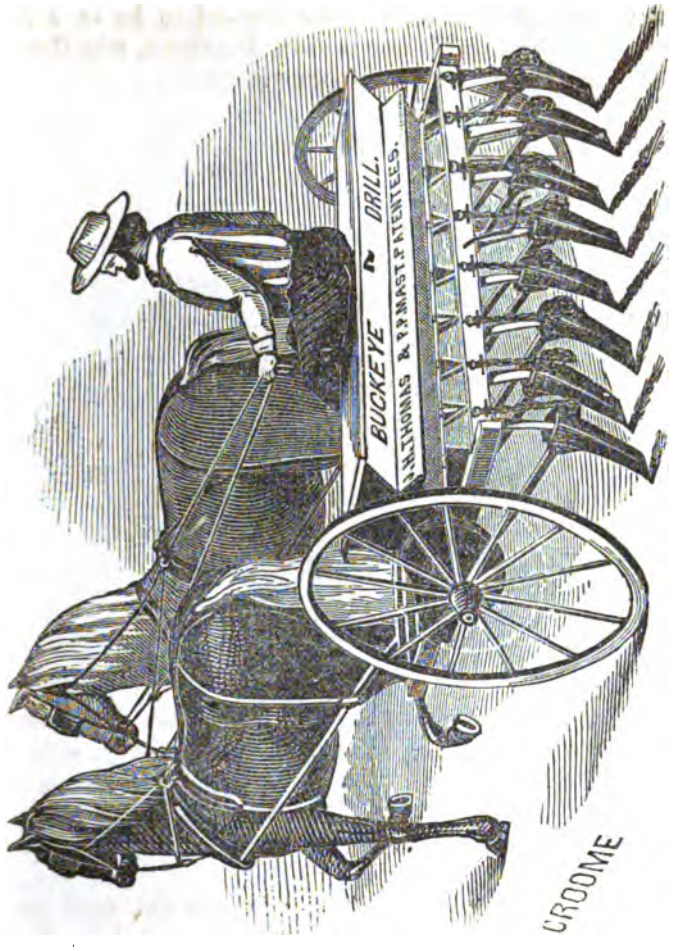
WHEAT DRILL AND BROADCAST SEED SOWER.



WHEAT SOWN IN DRILLS.



WHEAT SOWN BROADCAST.



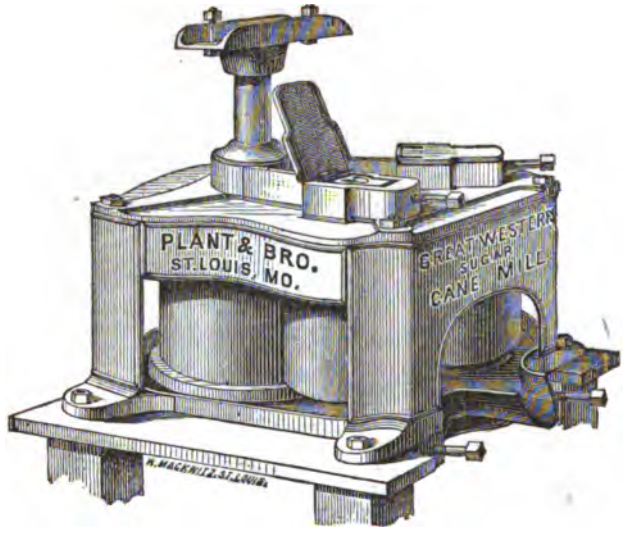
BUCKEYE GRAIN DRILL AND GRASS SEED SOWER.

The drill is very celebrated, and in extensive use in every grain growing district in the Union. Attached is a broadcast seed sower. This implement is daily growing in favor with our Missouri wheat growers.

It is believed that wheat drills are too little known and appreciated in Missouri. Wherever they have been used in the State, so far as known, they have given good satisfaction. They have been steadily gaining in favor among the best practical agriculturists eastward of us. In traveling from New York to St. Louis, about the first of October last, when the newly sown wheat was nicely up, almost every field of it, on well improved farms, was observed to be in drills.

There is found to be a saving of one to two pecks of seed wheat to the acre, by the equal distribution of any given quantity, by the insuring of the favorable germination of all the seed, being covered at a uniform depth. A narrow furrow is left, with a ridge on either side of the seed, which catches and holds the snow in winter, and in spring, the roots being kept covered by the earth melting from the ridges, a very good guarantee is afforded against freezing out or winter killing, and the crop has generally been found to be increased from fifteen to twenty per cent., besides a saving in time and labor. To use the

wheat drill most successfully, requires the ground to be in a good, mellow, fine condition, and this is one reason, doubtless, why the crop is increased. There are a variety of patterns in use.

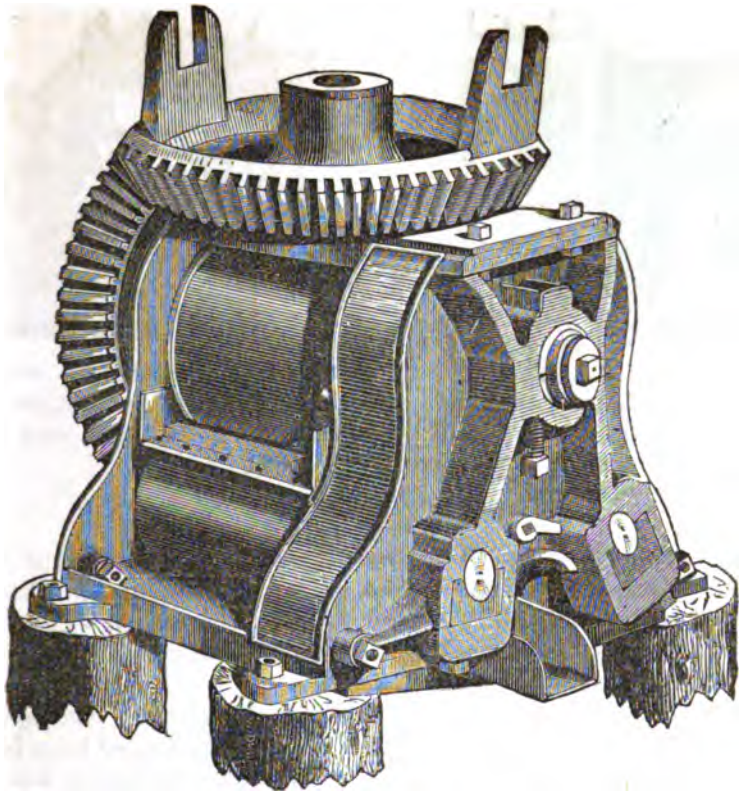


GREAT WESTERN VERTICAL SUGAR CANE CRUSHER.

The manufacturers say the great peculiarity of this mill over all others consists in the cog-gearing being made very heavy, with two clutches on each, which clutch in two corresponding ones on each roller, making a very simple but strong fastening, thereby doing away with all keys, enabling any one to take the entire mill apart in a few minutes.

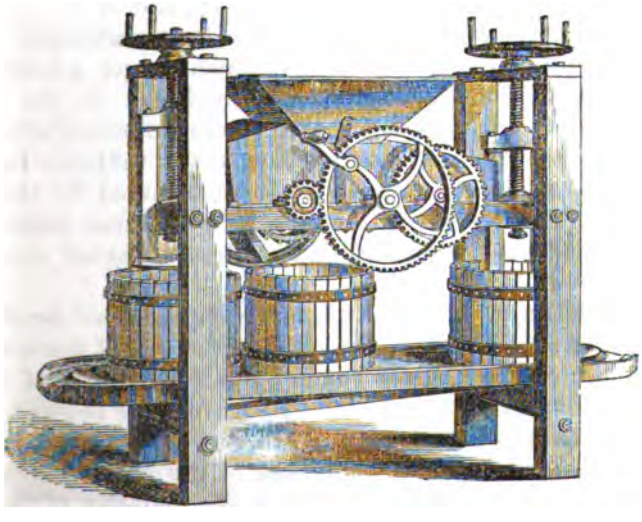
The step boxes are provided with oil chambers, which hold nearly half a pint, and are so constructed as to prevent any oil from getting into the juice.

The gear wheels are at the top of the rollers, instead of the bottom, bringing them nearer the power, and are entirely closed in by side plates, making it impossible for the operator to get either his hands or cane into the gear.

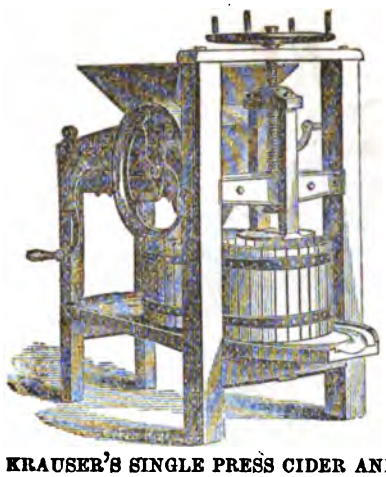


GREAT WESTERN HORIZONTAL SUGAR CANE CRUSHER.

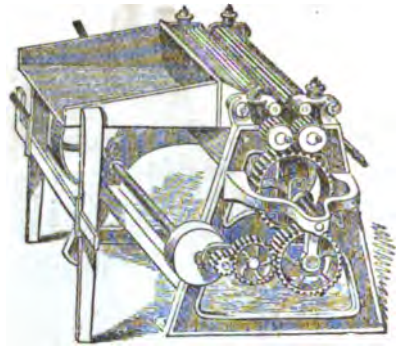
This is a heavier mill than the preceding one, more costly and better adapted to work on a large scale.



KRAUSER'S DOUBLE PRESS CIDER AND WINE MILL.



KRAUSER'S SINGLE PRESS CIDER AND WINE MILL.



SANFORD & MALLORY'S PORTABLE FLAX AND HEMP DRESSER, patented September 16, 1862, and April 28, 1863.

This machine has proved quite successful. It is said that it will effectually break out all the shives without injury to the fibre, and that the yield of flax fibre, in proportion to the weight of flax straw dressed, exceeds, by at least one-fourth, that obtained by any other machine or process.

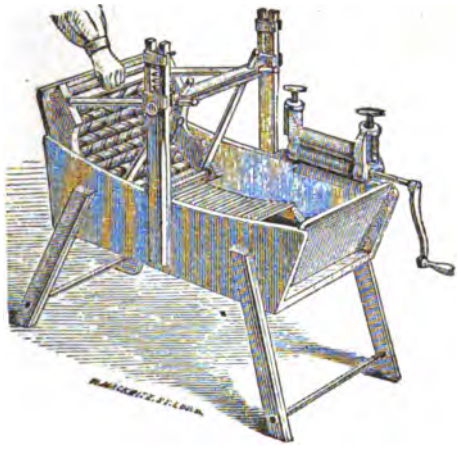
This machine has been largely used in the Eastern States, and is considered a highly valuable improvement. It has also been further improved since the above cut was made. Much attention has been given, and means appropriated by the United States Government, and by several States, within the last few years, for the purpose of investigation and the development of improvements in the manufacture of flax. It is an important interest to the whole country. We import flax seed, linseed oil and linen very largely, and it is believed unwisely. The culture of flax in Missouri has been neglected. The seed commands a high price, and there is a much larger amount of seed used in St. Louis for making oil than is produced in the State. If machines can be introduced for the successful manufacture of the straw into lint, the flax crop may become very profitable here. It is believed that a degree of success has been attained by the Sanford & Mallory machine deserving the attention of those interested. A large power machine is made which will dress tangled straw, either rotted or unrotted.

Plant & Brother, St. Louis, to whom we are indebted for the cuts of implements here introduced, are agents for the sale of these machines.

We do not intend to entirely neglect the department of the ladies in respect to labor-saving machines. Improvements in this regard are quite as important as any other, and are now more than ever needed.

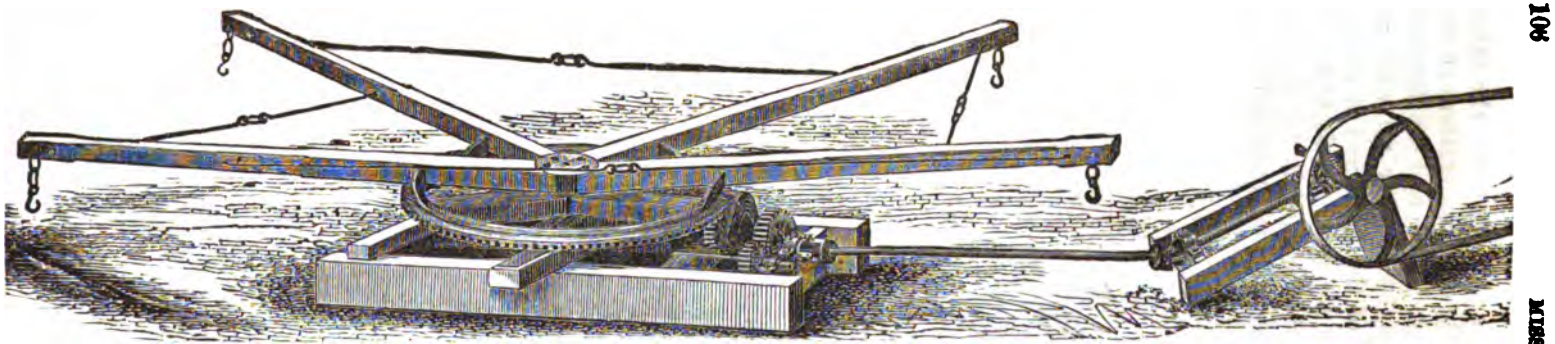
The comfort, economy and happiness of the household has much more to do with successful farming than the majority of the farmers

seem to be aware of. Whatever facilitates and economizes the labor in the house, has its influence over the whole of the operations of the farm. If the comfort of the household is neglected, and the farmer's wife becomes a drudge, the sons and daughters grow up with an inveterate dislike and distaste for the life of the farm, and of course embrace the first opportunity to forsake it for the hazards and perplexities of trade, the professions, etc. Such a result falls far short of truly successful farming, even though money be accumulated by it.

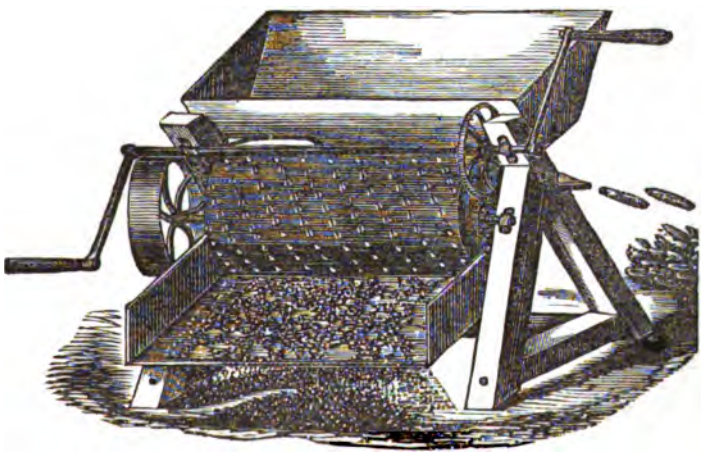


QUEEN OF THE WEST WASHING MASHINE.

The "Queen of the West" washing machine has been largely sold, and gives good satisfaction, probably better than the majority of washing machines of greater pretensions.



OHIO FOUR OR EIGHT HORSE LEVER POWER, WITH JACK.



MISSOURI HAND OR POWER CORN SHELLER.

RICHARDS' IRON CHAMPION
CORN SHELLER.

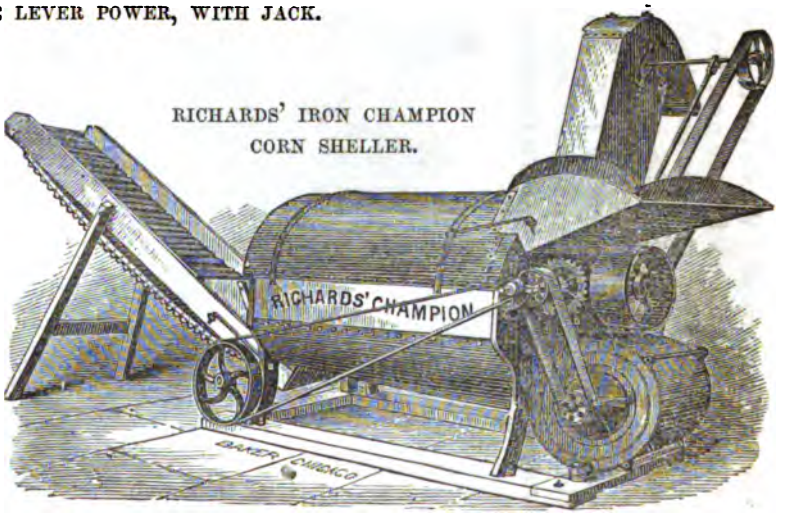
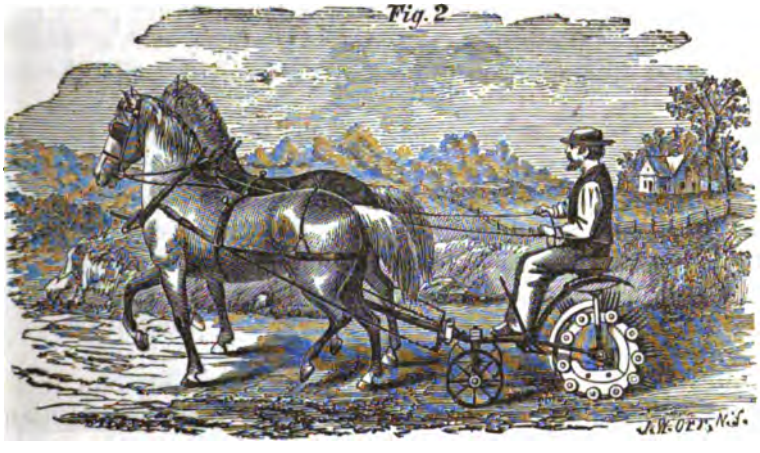


Fig. 1

Fig. 2



COMSTOCK'S ROTARY SPADER.

The cut is of size No. 2, with five tines. Figure 1 represents it in working position. As shown in figure 2, it is folded to turn at the ends of the land, or to travel from field to field without working.

By means of the lever on the foot board, it is readily put in working position, or folded, with foot or hand of the driver, while riding or walking, and is perfectly under the control of any person capable of driving a team.

This Rotary Spader is a Western invention, and is, without doubt, justly considered one of the most, if not *the* most important of the recent inventions in farm machinery.

Hon. M. L. Dunlap, or Champaign, Illinois, Editor of the *Illinois Farmer*, gives the following account of its operation:

On several occasions we have made mention of this new implement, but until last week we have had no opportunity to see it in full work-

ing condition—that is, in performing its daily task in that regular way to which all new agricultural implements must sooner or later come to the test of thorough trial.

As intimated in the June number of the *Farmer*, the machine was having a thorough trial on the farm of Mr. M. L. Sullivant, near Homer, in this county. On visiting Mr. Sullivant, we found that not only himself, but foreman and all hands, had spader on the brain. Mr. Comstock, the inventor (not the *ci-devant* Professor of *terra culture*), was present, and it might be that he mesmerized the parties so as to produce the effect so fully apparent.

Note book in hand, with a copy of Daboll in our pocket, or at least a vivid recollection of its pages as conned in boyhood, we were fully armed against any sinister influence from those in charge, with the inventor included. For two days we gave it a thorough investigation, and are now satisfied that we can speak of it by the card. A careful account has been kept of the work, which will give a very correct idea of the value of the implement in a labor-saving point of view. There are four of these spaders in use on the farm, each of which is in some respect different from the other. We will describe them somewhat at length.

LARGE FOUR-HORSE SPADER. This spader is three feet long, with a cylinder of two feet diameter. It has twelve forks with six tines each. The cut is six and one-fourth inches; that is, the spading tines enter the ground that distance apart. This distance is uniform in all the machines. This machine has been run twenty-six and three-fourths days, and has spaded one hundred and sixty acres, or within a fraction of six acres a day; in fact, so near that it might be called six acres.

SMALL FOUR-HORSE SPADER. This spader is twenty-one inches in diameter, has ten forks with five tines each. Being less in diameter, the motion is about one-fifth quicker than the large spader, and having less tines, it apparently works with less power. In every respect, this is the best machine, and the one to be adopted for general use. The team attached to these machines traveled at the rate of two and three-eighths miles an hour, which will give, for ten hours work, something over the six acres; but there is always a loss of time in turning and stoppages, and the only safe way to get at the amount of work done is as stated above, taking the performance of several days. To plow an acre with furrow slice of one foot, requires eight and a fourth miles of travel, just about what a good team will average in half a day; in fact, unless the lands are half a mile long, they will but seldom accomplish this amount, and oftener plow three-fourths of an acre in half a day of five hours. It will be seen that the teams alluded to traveled sixteen and a half miles a day, besides passing around the ends of the lands and in going to and from their work. We think this a good average day's work, full as much as can be expected of any good team. A team hauling a load on a solid road will travel more

miles in a day, but in plowing we must take into consideration numerous stoppages, that take, in the aggregate, no little amount of time. The teams that work the two spaders are no more than a fair average of farm teams, either as to size or speed, and we therefore think the result will prove a fair average of what may be expected of the performance of the spaders. We have seen various figures and estimates in this connection, some of which make the work an acre to the hour. Doubtless this can be done for an hour, but we prefer the actual showing of a month's work as above.

We should have stated that the small spader has worked twenty-six and one-fourth days, doing the same amount of work as the other; in fact, they both work on the same land and perform the same number of "bouts" each. Here is three hundred and twenty acres, or half a section, spaded with the use of eight horses and two men. They have but to work eighteen days more at the same rate, to save in labor the cost of the two machines, four hundred dollars.

THE SAVING OF LABOR. We see that one man and four horses spade as much in a day as three men and six horses turn over with the plow, making a saving of one team and two men, which will stand thus:

One day, team and man	$3 00
One day, team	1 50
	$4 50

Spading six acres, at the cost of seventy-five cents per acre:

Three days, team and three men	$9 00

—Or one dollar and a half per acre; thus making a saving of one-half in the cost of plowing, without taking into account the extra cost of the spader; but this we offset against the cost of sharpening the plow, which expense is not required in the spade tines, as they are self-sharpening. The three dollars a day charged is intended to cover the use of team, spader and wages of the man.

The spader pulverizes the soil to the depth of eight inches, while the average of spring plowing for corn is not to exceed four inches. We are not disposed, in this connection, to speculate on the difference in value of the two modes of preparing the soil, but prefer to leave it to the actual fact of the crop, as seventy-five acres have been plowed and spaded in alternate steps of one hundred and thirty feet wide—an amount sufficient for a pretty thorough test. The saving of labor, as stated, we do not think can be controverted.

OX TEAM SPADER. Two other spaders are used with ox teams. One of these is three feet wide, with a diameter of seventeen inches. The speed of the oxen being slow, not exceeding one and a-half miles an hour, the motion of the machine must be regulated by a less diameter. To this machine was attached three yoke of oxen, and in fourteen days had averaged four acres a day, or fifty-six acres. Neither yoke of these cattle could have handled a common plow

to do good work. This spader had eight forks with six tines each. The other spader was made three feet and eight inches wide, intended for the width of a corn row, to which was to be attached a corn planter. This had not been done, though the idea is not abandoned. This spader had also eight forks, but no increase of tines, the six tines being placed farther apart. This machine was also drawn by three yoke of oxen.

The horse machines had trucks in front, and weighed about nine hundred pounds each, trucks included, while the ox spader, without trucks, weighs about six hundred pounds. With these latter the work is not as well done, from the fact that the speed of the oxen is not as regular as that of horses. The wide machine, which spades five acres a day, does not appear to require more power to draw it than the other; both having the same number of tines to the fork, probably accounts for the apparent discrepancy. A trial is to be made with the horse machine to see if the effect is the same; if so, another acre a day will be added to its capacity. The last mentioned spader has worked six days and spaded thirty acres. For twelve days the two ox spaders were put in a gang, drawn by six yoke of oxen, driven by one man, and averaged eight acres a day; but they are found to do better singly, and it is not probable, unless very short handed, that they will be worked together again.

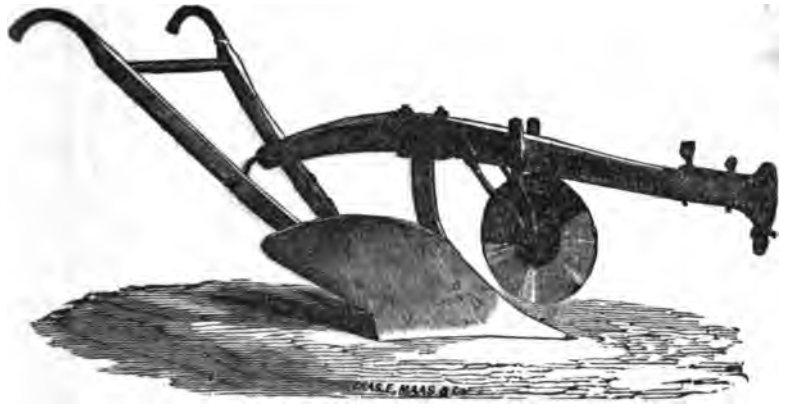
The aggregate amount of spading done up to June 1st, inclusive, was five hundred and two acres, at an average cost of seventy-five cents an acre, making a saving of seventy-five dollars on each hundred acres, over the use of the plow. This must be looked upon as a vast stride in the field of progress, and will, at no distant day, have the effect to cheapen the great farm staples, for it is not as much in the saving of labor as in the increased crop that will be produced by the superior work accomplished.

By the use of the spader the soil is loosened up to the depth of eight inches, without throwing to the bottem the free potash that has become disintegrated by long exposure to the atmosphere, and which, upon being buried again to that depth, would become fixed and no longer available to the young plants, which must await the slow process of æration to prepare a new supply.

ROCK ISLAND PLOW.

The Rock Island Plow is becoming well known in the State Missouri and southward.

A NEW KIND OF PLOW.



MOULDBOARD VIEW OF F. F. SMITH'S PATENT, RIGHT OR LEFT HAND CAST, CAST STEEL TURF AND STUBBLE PLOW.

The following is what the manufacturers and agents say of this plow, and so far as the advantages are concerned, I do not hesitate to say, from personal knowledge, that I believe it to be correct:

"These celebrated plows are manufactured by an entirely different process from all others now in use. The mouldboards, shares and landsides are cast by pouring molten cast steel into iron molds, thereby chilling the steel, which, with the patent process of hardening, gives them a much harder and smoother surface, besides extreme durability, than ever before attained, causing them to scour in any soil, to run lighter and with less friction than any other plow, consequently they will last as long as two or three ordinary ones.

"ADVANTAGES. A superior quality of steel, by a peculiar process, is cast into the desired shape, and is so tempered that a hard knife or glass, when scratched upon its surface, will scarcely leave a mark.

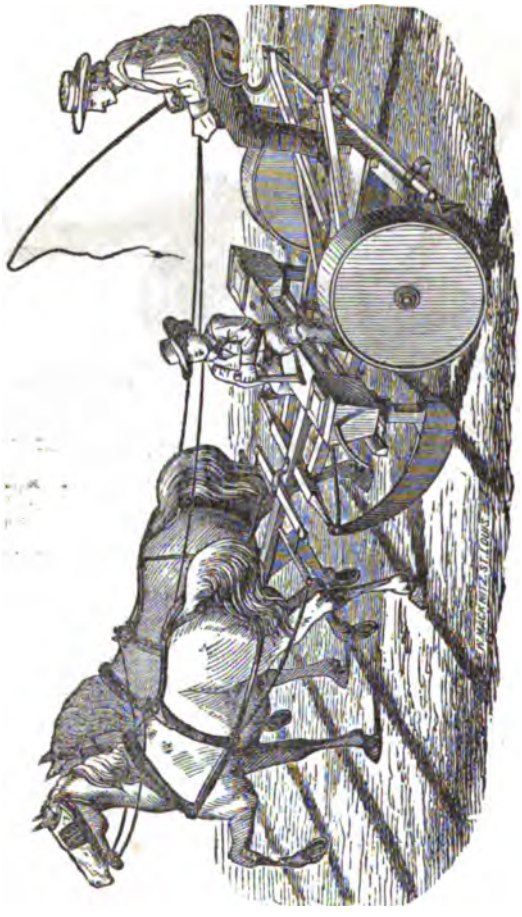
"Each section is cast of varied thicknesses, giving those parts most exposed to wear any desirable thickness and strength that may be required. Hence the durability claimed for it.

"Each plow of the same letter or number being precisely alike, any section can be replaced by a new one, fitting perfectly. The share is maleable, and can be sharpened by hammering while heated.

"Its ease of draft is unsurpassed, being nearly one-third less than the ordinary two horse plows now in use. This and their durability is no longer a matter of conjecture, as it is the invariable verdict of those who have used them, that they run lighter and will wear as long as three or four of the best plows now in use.

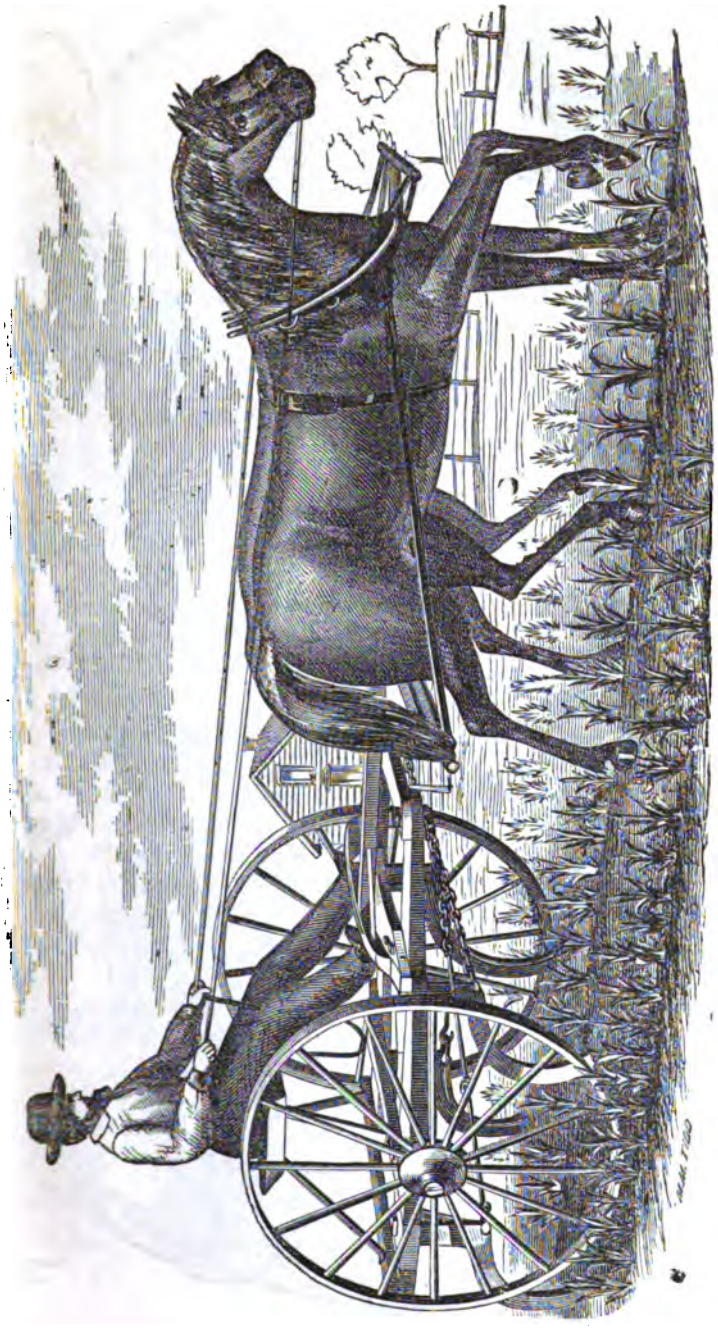
"Each plow is warranted to run level, turn perfectly and scour in any soil, or may be returned."

These plows are made of various sizes and different patterns, for different purposes.



SHELBY'S DOUBLE CHECK ROW CORN PLANTER.

The new corn planters, one of which is here illustrated, are among the most important of the newly invented labor-saving implements to the Western farmer; in fact, those who grow corn extensively consider them almost indispensable.



STAFFORD'S SULKY CULTIVATOR.

This cultivator was invented by a practical Illinois farmer, and has given good satisfaction. It effects a saving of fully two-thirds of the labor over the single shovel plow.

CHAMPION REAPER AND MOWER, NO. 2.

DESCRIPTION OF CHAMPION REAPER AND MOWER, No. 2.

This machine is made almost entire of wrought iron, combining great strength with little weight. It has two driving wheels, acting independent of each other, and also of the main frame and cutter bar, thereby permitting the wheels to conform to the undulations of the ground over which they pass, without affecting the cutters.

The cutter bar is cast steel, with wrought iron fingers, and is flexibly attached to the main frame, and free to adjust itself to the uneven surface of the ground, independent of the main frame or driving wheels.

The machine can be turned in either direction without stopping the motion of the knife.

The driver can raise the cutters over stumps, stones or other obstructions, while the machine is in motion, by means of a lever arranged for that purpose. There is but little weight on the grain wheel which supports the outer end of the cutter bar, as almost the entire weight of the machine is carried on the driving wheels.

The cutter bar can be folded up to enable the machine to pass though bars or gateways, or be transported from one field to another, without detaching the knife or cutter bar.

The machine can be backed without working the knives.

The outer shoe, which runs in the grass, is only two inches wide, and the last knife cuts no more than any other, leaving no ridge or high stubble at the edge of each swath.

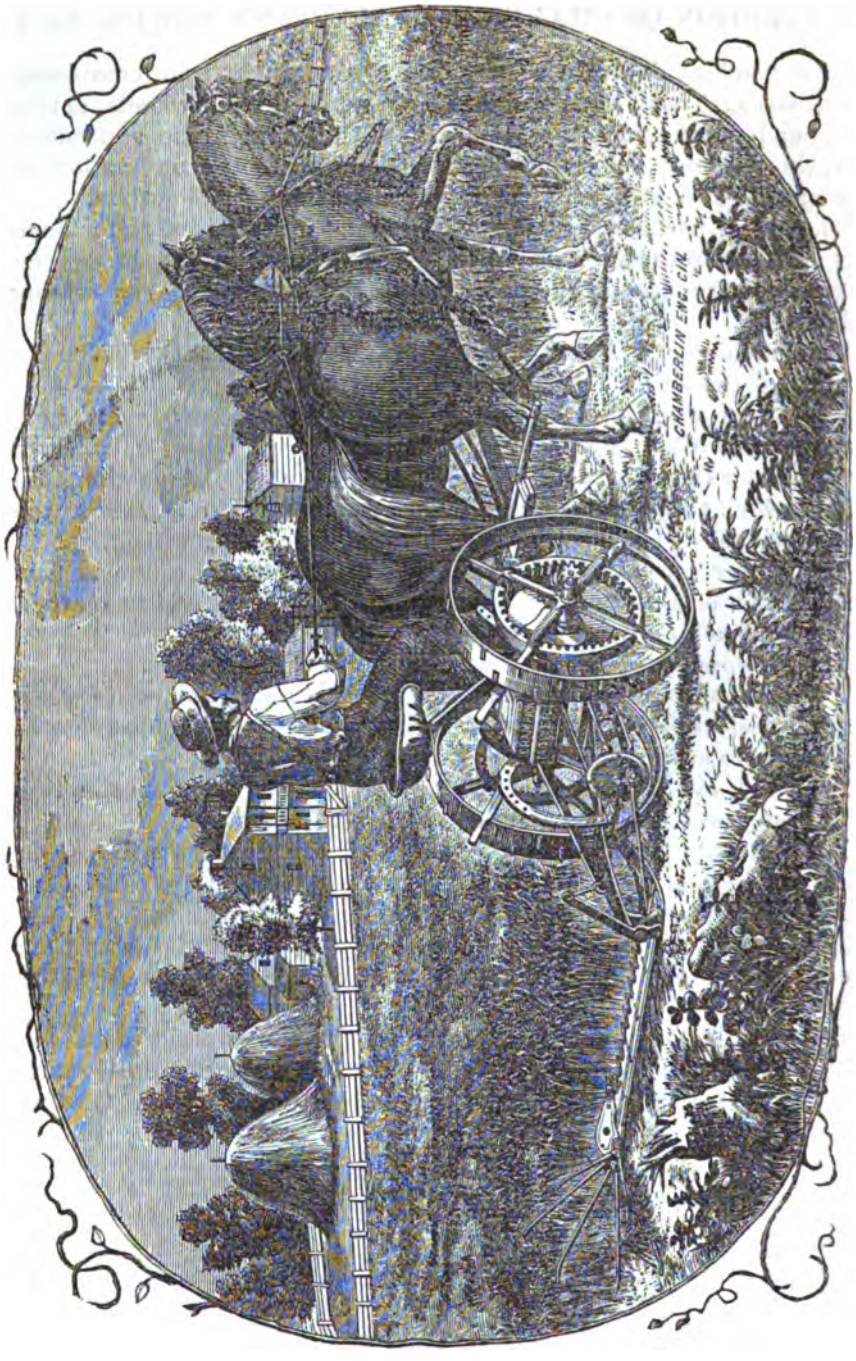
The track clearer revolves, turning the cut grass from the standing with ease, instead of dragging heavily upon the ground.

The oil boxes are all capped, preventing the dust from falling in upon the bearings.

A finely tempered spring under the seat.

The cutter bar is oscillating, sidewise as well as endwise, admitting the angle of the cutter to be changed to suit the unevenness of the ground.

This machine is light draft, no side draft or weight upon the horses' necks, strong, substantial and reliable in its operation—is combined to reap and mow, or mow only, and in either capacity has no superior.



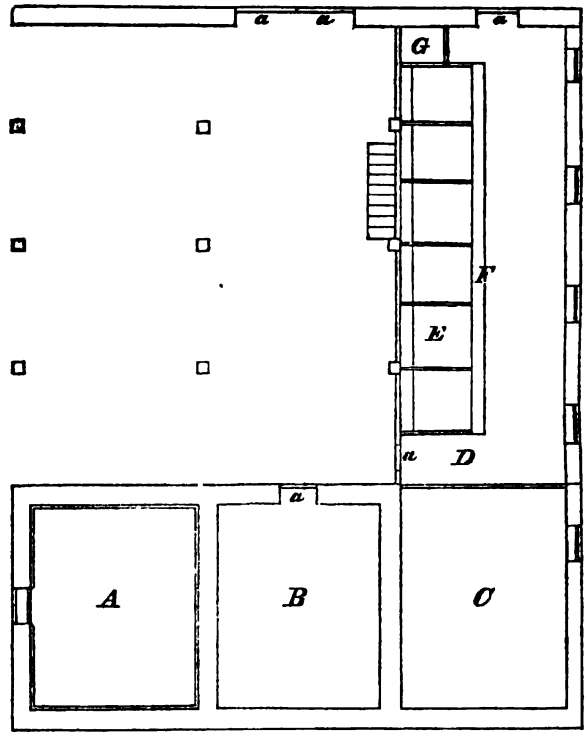
CHAMPION NO. 2—AS A MOWER.

VANDIVER'S MISSOURI CORN PLANTER.

In this day of improvement it is taken for granted all farmers are convinced of the utility of a horse power corn planter. The peculiar feature of this planter is the concave wheels and the coverers. No matter how rough the ground may be, or wet, the work with this planter is well done. Most planters open a trench in which the corn is planted, but without something in front of the wheels, the pressure is on either side, and not upen the corn, where it should be. With this machine, by means of concave wheels and coverers, a ridge is formed, and the earth at the same time pressed on the corn. The runners are of nicely polished cast steel, with open furrows sufficiently to admit of corn scattering in the hill, so that there is no difficulty in thinning the corn. With coverers the work must always be well done, while without there would always be, in foul or roughly prepared ground, more or less corn left to be covered with the hoe or picked up by birds. An important advantage of the coverers is that they cover all the corn and form a ridge, over which the concave wheels pass, causing the pressure to be equal on the whole width of the ridge, which is ten inches wide. This machine is a self-dropper when planting drilled corn, and only needs an operator when check rows are desired; will deposit corn deep or shallow, as may be desired; will plant in the roughest or foulest land or toughest prairie sod, and does better work than any planter in use, in all kinds of land; plants check rows that can be plowed either way; warranted to perform as recommended. If intended to plant prairie sod, extra cutters and rims are required, for which an extra charge is made. This a Missouri machine, invented by a Missouri farmer.

Barnum & Brother, dealers in agricultural implements, St. Louis, are agents for the machines.

FARM BARN OF L. B. HOLLAND, ESQ.

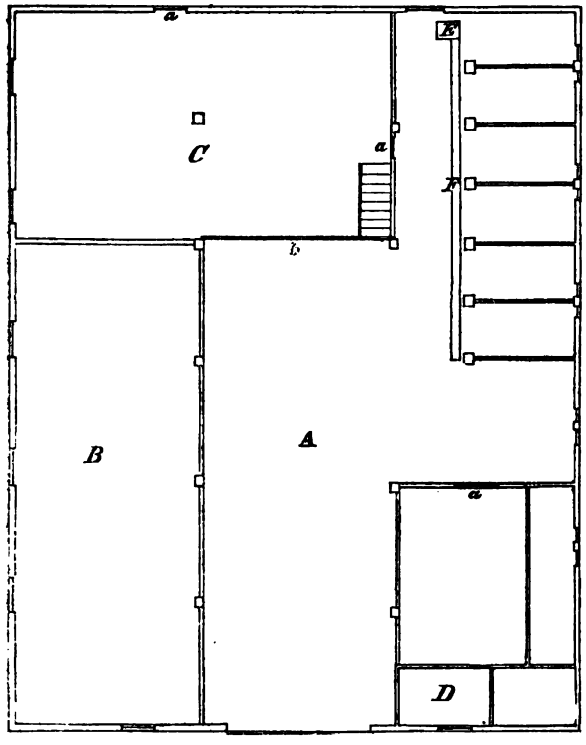


Basement plan—scale, one-sixteenth of an inch to the foot.

EXPLANATION.

A. Ice room.
B. Root cellar.
C. Stable.
D. Passage.
E. Cattle stalls.
F. Gutter.
G. Manure box.
a, a, a, a, a. Doors.

The large open space, showing the places of supporting pillars, is used for storing wagons, machines and farm implements. It fronts to the east.



First floor plan—scale, one-sixteenth of an inch to the foot.

EXPLANATION.

A. Main floor.
B. Bay.
C. Carriage room.
D. Grain bins.
E. Trap door.
F. Gutter.
a, a, a. Doors.
b. Sliding doors.

The front or main entrance doors are also sliding. Above the floor shown in the plan, is a second floor, covering about two-thirds of the size of the building, for storing hay, oats or fodder, up to the roof. From the center of the roof, or near the main ventilator, is suspended a horse hoisting fork. The harness is hung in the carriage room, which can be kept closed and free from dust. The horse stalls are on this floor, seen at the gutter, F. On a partition at one side of the main floor is painted in large letters, in a circular form, "No smoking allowed in this building."

The farm of Mr. Holland is situated near Glendale Station, on the Pacific Railroad, about twelve miles west of St. Louis. It consists of

two hundred acres, seventy five in cultivation. The land is undulating, and all arable. The soil is a yellow clay loam. Timber, chiefly post oak and hickory. There is a fine natural pond, named Lake Como, about forty yards long by thirty yards wide, about fifteen feet deep, and stocked with fish, situated on the eastern part of the farm, surrounded by the main orchard. The orchard consists of about fifteen hundred apple trees, four thousand peach trees, eight hundred dwarf pears, one hundred and fifty quinces, sixteen hundred grapes, one-third of an acre of currants, etc., mostly planted about five years ago. The principal varieties of apples are Red June, Early Harvest, Rambo, Winesap, Genitan, Newtown Pippin and Yellow Bellflower.

The corn raised and fed on the place is ground in an iron corn mill, which grinds also for family use.

Mr. H. has a pure Devon bull and several very fine grade Devon cows. He likes the stock very much. He also has a bull and several very fine heifers of the Ayrshire stock, purchased last fall from the herd of Hon. Samuel Campbell, of New York Mills, New York, notice of which is given on preceding pages.

AGRICULTURAL EDUCATION.

The subject of agricultural education is one of great interest and importance to the people of Missouri at this time. Having by legislative enactment accepted the grant of lands for agricultural education, made by act of Congress, approved July 2, 1862, it is important that we should comprehend fully the meaning and intent of said act, and the terms and conditions upon which we have accepted the grant. A misinterpretation of the organic law, or a misapplication of the funds arising from the grant, may subject the State in the future to serious perplexity, loss and forfeiture. To guard the interests of the State in this respect, it is the evident duty of legislators and others interested, to thoroughly investigate this subject. The fact that different opinions have been entertained, different interpretations made, and diverse action taken in other States, is evidence of the necessity for investigation, and suggests the importance of thoroughly acquainting ourselves with what has been done elsewhere.

To secure the greatest benefit from agricultural education is a matter of still greater importance, and as the subject is comparatively new, no small amount of thought, study and investigation will be requisite to the attainment of success.

Since the organization of the State Board of Agriculture, some eight or nine months ago, considerable information concerning this subject has come into possession of the Board. It would, no doubt, be useful to give nearly the whole of such information to the public of Missouri, but want of space will scarcely permit a digest of it.

About seventy or eighty years ago, agricultural education began to attract public attention in Europe, and about the year 1806, the first

agricultural school was established. Since that time such schools have become quite numerous in various European countries. During the last twenty-five years the subject has attracted much attention in this country. It has been discussed in agricultural societies, and memorials and petitions, without number, have been sent to Congress praying for a portion of the public domain for the purpose of establishing agricultural colleges.

Previous to the great rebellion, without national aid, agricultural schools had been established in quite a number of States, with greater or less success, and some failures. Enterprising, progressive and hard-working agriculturists were the prime movers, earnest and almost sole workers in the cause up to the time that the grant of lands was obtained from Congress. Since that time hundreds of literary professors have taken a remarkable interest in agricultural education. They have suddenly found that their particular colleges were admirably adapted to teach agriculture.

So many conflicting interests have arisen to claim the benefits of this grant of Congress, that agriculturists have found, after laboring a score of years to obtain it, that they still have a more arduous task to perform in preventing it from being absorbed by existing literary institutions, or so divided up as to be nearly worthless, or otherwise frittered away or diverted from its legitimate purpose. Agriculturists being a persevering and tenacious class of people, especially when they are sure they are right, will be likely to guard very zealously this interest which is so dear to them, and any attempt to misapply the benefits of the grant will almost certainly result disastrously, sooner or later.

Previous to the grant of land in 1862, agricultural colleges existed in Pennsylvania, Maryland and Michigan, with fair success. Iowa had projected an agricultural college and farm, and had commenced operations, but had no college edifice. Efforts in two or three other States had proved failures.

In 1854, the Missouri State Agricultural Society, which existed at that time, took some action in favor of agricultural education, and their record of that date shows the following:

On motion, it was

Resolved, That the President of this Society appoint a committee of five members to prepare a memorial to the Congress of the United States, upon the subject of agriculture, and the establishment of a seminary or school of agriculture, in connection with the "Smithsonian Institute," and for a donation of the public lands, as an endowment to the Missouri State Agricultural Society.

Whereupon, the President appointed Colonel Samuel A. Young, Major James S. Rollins, Colonel W. F. Switzler and John Slack, Esq., of the county of Boone, and Colonel Thomas C. Anderson, of the county of Callaway, said committee.

In 1858, a bill was introduced to Congress by Honorable Justin S.

Morrill, of Vermont, "granting lands for agricultural colleges." It was essentially the same as that which became a law in 1862. The bill of 1858, after passing both houses of Congress, was vetoed by President Buchanan, allusion to which is made by Mr. Morrill in his speech on the new bill, which is here inserted:

MR. CHAIRMAN: I shall avail myself of the parliamentary privilege to-day, of general debate, to make a speech without the pepper and spice of party or sectional politics, and yet, I hope one not without some interest to the House. I shall discuss a measure which has heretofore received a generous support on the part of Democratic members, almost the undivided support of the South American members (formerly so-called), and, with about two exceptions, the undivided support of the members on this side of the House; I mean the land college bill, for which I hope to obtain the favor of a large proportion of the present House.

Mr. Chairman, among all the measures before Congress, since I have been a member, there have been few, save those designed to maintain the credit of these United States, which my judgment and heart have more approved than this measure, providing for the education of the industrial classes of young men of our country. Just in itself, benevolent in its scope, demanded by the wisest economy, it will add new securities to the perpetuity of republican institutions. Wronging nobody, it will prove a blessing to the whole people now and for ages to come.

The bill, or one like it, has once passed Congress by very large majorities, but unfortunately, among other sins which President Buchanan now has leisure to repent of, is his veto upon a bill of this character. Under more favorable auspices it is now again brought forward. If it passes, as I cannot doubt it will pass, Mr. Slidell, were it convenient for him to be here, could hardly command a veto from the present patriotic occupant of the White House, as he was charged with having done on a former occasion. With this Congress my humble services here will terminate, and the only favor I have to ask of the House is to vote upon this measure squarely on its merits. If its character challenges approval, if the times more than ever persuade to its adoption, then give such a vote as will wake into life the instrumentalities whereby a solid, useful and practical education can be had, on terms within the reach of thousands willing and expecting to work their way through the world by the sweat of the brow.

It is true that some measures which we have been considering, of more or less merit, I have thought it inopportune to press at this particular juncture of affairs; but I do not include this among them. Instead of being postponed, it is a measure that should have been initiated at least a quarter of a century ago, and if it had been, our taxable resources would now have been far greater than they are, and the absence of all military schooling would, at the outset of the present rebellion, have been less conspicuous in the loyal States. Agriculture might long ere this have felt its influence; the statistics of the country might have been more abundant and valuable; the young men might have had more of fitness for their sphere of duties, whether on the farm, in the workshop, or on the battlefield.

Something of military instruction has been incorporated in the bill, in consequence of the new conviction of its necessity, forced upon the attention of the loyal States by the history of the past year. A total unpreparedness presents too many temptations even to a foe otherwise weak. The national school at West Point may suffice for the regular army in ordinary years of peace, but it is wholly inadequate when a large army is to be suddenly put into service. If we ever expect to reduce the army to its old dimensions, and again rely upon the volunteer system for defense, each State must have the means within itself to organize and officer its own forces. With such a system as that here offered—nurseries in every State—an efficient force would at all times be ready to support the cause of the nation, and secure that wholesome respect which belongs to a people whose power is always equal to its pretensions.

This bill proposes to establish at least one college in every State, upon a sure and perpetual foundation, accessible to all, but especially to the sons of toil, where all the needful science for the practical avocations of life shall be taught, where neither the higher graces of classical studies, nor that military drill our country now so greatly appreciates, will be entirely ignored, and where agriculture, the foundation of all present and future prosperity, may look for troops of earnest friends, studying its familiar and recondite economies, and at last elevating it to that higher level where it may fearlessly invoke comparison with the most advanced standards of the world. The bill fixes the leading objects, but properly, as I think, leaves to the States considerable latitude in carrying out practical details. Some of the States already have colleges started on the principles here embodied—as Pennsylvania, New York, Michigan, Maryland, Ohio and Iowa—but these linger with

a very incomplete staff of professors, as might be expected from the scantiness of their funds. The aid tendered here will enable these States to fully equip these institutions, or to found others where it may be thought wise to give military science something of greater prominence. Some States, perhaps, may have more literary colleges than are or can be liberally sustained. Part of these may be easily transformed so as to come within the terms here proposed. Every State will be the judge of its own requirements, and, I have no doubt, each will feel sufficient interest in the subject to make a judicious disposition of the grant.

Against all speculation or squandering, this bill is most stringently guarded. The entire fund is to be held good, and wholly devoted to the object, as the States are to pay all incidental expenses, even the first cost of the buildings and their subsequent repairs. But it cannot be doubted that in every State this charge will be mainly a nominal one, as many towns will be likely to strive to secure the location of these institutions within their limits, and an active competition will arise from the tender of lands and buildings in order to obtain an end so desirable.

If these colleges should be established, it is to be hoped the donation of lands, with some little outside aid, will be sufficient, at no remote period, to offer instruction free of any charge for tuition, and that, through connection with farms which may be attached, indigent young men, by voluntary labor of a few hours each day, may, where desirable, give an equivalent, wholly or in part, for their board. Certainly the opportunity of obtaining a sound education, adapted to the wants of the individual, will be offered at reduced rates, a love of useful labor will be promoted, and thus health and usefulness cannot but be advanced among those who otherwise might waste a life in uncultured ignorance or cultivated imbecility.

Not one in fifty of those young men who apply to us to be nominated as candidates for the military or naval schools can be gratified. All these young men feel conscious of their ability to do something honorable for themselves and their country, and their ambition takes the direction of these schools, mainly because they know not how elsewhere to obtain a fitting education. The numbers of this class will now be greatly augmented. The ability of parents to educate their children will be curtailed, while the desire to obtain an education, especially a military one, will have been increased. These young men, if this bill should pass, will find a field open to them large enough to satisfy all reasonable ambition.

There is no appeal that comes so resistlessly to our sympathy—and there are few men here, I dare say, who have not felt it—as that of a bright-eyed boy, without means, but strong in virtues and noble aspirations, seeking the temporary aid that will enable him to achieve a liberal education. Let the corner stones of these land colleges be laid, and this army of lads, who are so soon to take charge of the institutions of our country, will, with all the enthusiasm of faith and hope, "thank God and take courage!"

The question, "what shall we do with the public lands?" has long been one of the most interesting political problems to be solved. In ordinary times our taxation has been so light that the revenue obtained from this source might have been reimbursed from other sources, without much complaint; but now we have not only to curtail expenses, but to enlarge the circle of every revenue bill. From the seeming vastness of our public lands, magnified by all the wastes, mountains, waters and deserts, it has been thought impossible to overestimate their extent or value; and on the theory that they were inexhaustible, they have always, when sold, been held at an inconsiderable price—scarcely more than the fees for transfer and record of title in older countries—and, when given away, the mile squares have been bestowed with a lavishness only equaled in the days of feudalism. The legislator, from his dizzy height, has looked over all the broad area, and, like one of old, has been ready to say to all, with unappropriated votes, "all this will I give thee, if thou wilt fall down and worship me!" Grants for railroads and military bounties have been made with such loose abundance as to destroy the gifts, and more than satisfy all demands, whether of the hardy pioneer or the velvet-footed speculator. Our bounty has proven a deluge, rather than a refreshing shower. All markets have been glutted, until these Government largesses, sweated and consumed by their own reeking fatness, have shrunk to less than half of their original value, and in part now remain, having conferred benefits only by halves, to clog the operations of Government in its hour of largest beneficence and largest need.

The Government price for land, except to actual settlers for five years, is now one dollar and twenty-five cents per acre, and if it were five dollars per acre it would be no dearer than two dollars and fifty cents was twenty years ago to the settlers of Indiana and Illinois, and cheaper than any other land of equal value now to be had under the most enlightened and liberal government of the world. Even in Australasia, where they sell land at auction for all it will bring, the upset price in the poorest colonies has been not less than one pound sterling, or about five dollars, and then what more they can get; while the best lands, and those within three miles of any town, are held much

higher. To the 500,000 farmers in France, who own upon an average but seven acres each, one dollar and twenty-five cents per acre must appear a bagatelle, and to the Irish farmers, who, in some rare localities, pay £10 to £30 (or $50 to $150) rent per acre, it must look like a *bull* on the part of Brother Jonathan.

Those who have given this subject that attention it deserves, know settlement has already approached the limits of most of the profitable farming lands within our domain. Some of the lands are fertile, but destitute of wood or of water. The red man still wanders on the verge, and where he has disappeared the prairie wolf remains at least to frighten sheep. With some good, there is much poor land in our western territories. An acre may be worth the government price, provided there is a dozen prairie chickens upon it! In the new States much land is yet to be had, of great value, at very low prices, but comparatively little of this remains in the hands of Government. In our territories the fertile lands are not found to be universal, as they were nearly so in Illinois and Iowa, but they lie in parcels—here a little and there a little—embroidering the margins of streams, and standing forth in greater beauty from the rule of contrast—oases in the deserts.

There were, September 30, 1861, of surveyed public lands, 134,218,330 acres, the unsurveyed being many times greater. Of these lands it is proposed to donate to the States for these colleges, if all should accept the conditions, about 9,000,000 acres, or 6,000,000, if only the loyal States should be able to avail themselves of the grant. It is an inconsiderable grant in proportion to our means, and not a large one in proportion to the object in view. We have now abandoned the public lands as capital, with the design of deriving a larger revenue from those who may settle upon them and make them fruitful. And here these land colleges come in to aid in the plan of improving, not only the new lands, but also the old, and thereby extending the basis of taxation and revenue. A tract of land to a man who knows how to make it a real homestead, with all its train of joys, is a blessing; but to all others it is at best a bauble, and often a curse. To give all men an opportunity, by their own labor to obtain a substantial support, is a problem most governments endeavor to solve. We have a higher and possibly more difficult task, which is to combine the largest freedom with the largest rewards of labor—free government and personal independence—and this can only be done by the largest knowledge. Success in working out this problem secures the immortality of our republic. The man who earns but fifty cents a day cannot be taxed one-fourth part of it, or twelve and a half cents, without starving his children; but let him earn two dollars a day, and he will pay double the amount, or twenty-five cents, and not only survive it, but ask the tax gatherer to stop and dine!

The policy of the Government towards the Territories and the new States has been liberal, as it deserves to be; but I think few who have not read the report of the Secretary of the Interior are aware of the extent of that liberality. Within the last four years there have been granted to States and Territories, and reserved from sale, 49,754,606 acres. Each new State now has university lands, salt-spring lands, public building lands, and 500,000 acres each, under the act of 1841. One eighteenth part of all the lands are also at once given to the new States for schools. We have given them, up to 1861, 9,998,497 acres for railroads. Then we have surrendered all the swamp lands, amounting within the past four years to 3,910,310 acres; and the entire claims of the several States under this head amount to 57,895,577 acres. Added to all this, we give the land States five per cent. on all sales of land within their borders after they are admitted as States. This is not treating these States as step-children. The four States of California, Minnesota, Oregon and Kansas are entitled to 15,632,635 acres for school purposes alone. Beyond all, we have passed the homestead law.

All the bounty land warrants and scrip issued under different acts of Congress embrace an aggregate of 71,717,172 acres. Of this amount all the warrants have been located except 7,454,720 acres. If the present bill should pass, it would only about double the quantity now afloat, and scarcely exceed the amount allotted to some single States. The total amount of unsold and unappropriated lands is 1,046,290,093 acres; and, after deducting the proposed donation to these colleges, we could quadruple the amount and still retain over 1,000,000,000 acres, to be disposed of under the homestead act. Not so much as one per cent. will be abstracted.

This heritage may be so heedlessly overrun as to be soon wasted, leaving behind nothing but the estate of a prodigal; or it may be so managed as to hold all comers and give them unsurpassed prosperity for centuries.

As soon as the lands pass from the hands of the Government they become subject to local taxation, and that is clearly to be desired by land States and territories. The scrip issued will go into the hands of *bona fide* settlers, because such will be the only purchasers to be found, unless at a depreciation of price, and these will be obtained by the several States disposing of their scrip on a

credit and retaining the lien on the land. Such an arrangement will not certainly be to the disadvantage of the land States.

Saying nothing of what might be due from the new States to the old on the score of reciprocal generosity, by the present bill the land States will obtain their just proportion according to population, and it is not too much to say at the same time that more young men will be beneficiaries of these institutions in the other States who will become residents *of* than will be educated *by* the land States themselves. These States, therefore, should be more deeply interested in the measure than all others, and I invoke their Representatives to its just appreciation.

In a speech I had the honor to make in this House, (April 20, 1858,) prior to the passage of the bill of which this is mainly a copy, I attempted to show by the facts of the census of 1850, compared with those of 1840, including other State returns, that there was a constant and widely pervading diminution of crops per acre under our go-ahead system of farming, and that the main relief sought was such as that practiced by flocks of wild pigeons, which no sooner strip and waste one field than they take wing and fly further on.

If this deduction has any foundation, without some speedy and efficient remedy—reaching to every State, for there are none without more or less of lean-faced districts, poor farms, and poorer farmers—this agricultural decline will, at no remote time in the age of the nation, produce calamitous results. The census of 1860 is not yet published, so that a full comparison of another decennial period is impracticable; and, if the latest census tables were now at hand, the statistical information is too limited to afford more than a meager account of what it would be useful, if not creditable, for us as a people to know and to spread out on the record. By the courtesy of the superintendent, I have gleaned some facts which still indicate, I regret to say, the retrograde march of agriculture, and showing that the positions heretofore assumed have only too much support in the census of 1860. The facts are by no means agreeable—not calculated to puff us up with pride—but they should be resolutely examined to find, if possible, adequate measures of reparation, predicated upon the wants of all the States.

By the return it appears that the New England States have increased their number of horses, but to about the same extent have diminished the number of oxen, and it would be hard to say whether the gain or loss is the most profitless. All of these States, except Rhode Island, have increased the product of butter, and all fall off in the quantity of cheese, as well as the number of sheep, swine, and (except Maine and Vermont) in the quantity of potatoes. Of wheat, the whole quantity produced is pitiably small, being only 1,077,285 bushels, and of that 431,127 bushels is produced in Vermont. New York, in 1850, produced 13,121,448 bushels of wheat, and only 8,681,100 bushels in 1860, showing a decrease of 4,440,348 bushels. The number of sheep in New York

In 1840 was	5,118,777
In 1850 was	3,453,241
In 1860 was	2,617,855

This State has nearly 2,000,000 acres, or one-seventh part more land under cultivation than there was ten years ago, and yet the hay crop was less by 164,011 tons. The following table illustrates the position of New York:

	1850.	1860.
Horses	447,014	303,725
Milch cows	931,324	1,123,634
Oxen	178,909	121,702
Other cattle	767,406	727,837
Wool, (pounds)	10,071,301	9,454,473
Wheat, (bushels)	13,121,448	8,681,100
Sheep	3,453,241	2,617,855
Hay, (tons)	3,728,797	3,564,786
Swine	1,018,252	910,178

This is anything but complimentary to our system of agriculture, and yet few of the old States are doing as well so New York.

In seventeen of the States—nearly all the old—there has been a loss in the number of sheep, and the number in 1860 is 22,679,386, against 21,723,220 in 1850, or a gain only of 956,166 in ten years! But for the new States the loss would have been large, and the gain in the State of California (1,058,134) is more than equal to that of the whole Union.

Pennsylvania, with 46,000 square miles of territory, and 2,906,115 people, should raise as many sheep as England, with about 51,000 square miles of territory, and 17,000,000 people; and yet England has 30,000,000 sheep, and Pennsylvania but 1,631,540, which gives to England nearly two

sheep for every inhabitant, and 590 for every square mile, while Pennsylvania has little more than one to every two inhabitants, and only 35 to the square mile. With our unlimited cheap lands we should export millions of pounds of wool; but England, in fact, has, the past year, supplied us with millions, both of the raw and manufactured.

Flax and hemp, as crops, have nearly been blotted out of the Union, though considerable flax seed is still raised, to be crushed for the oil, while the fiber, the most valuable part, is thrown away. Home manufactures, in 1850, amounted to $27,486,219, but in 1860 they declined to $24,-326,744; so that women, in this branch of industry so intimately related to agriculture, notwithstanding the 4,000,000 more of women, are really toiling and spinning less than ten years ago, and but little more than they appear to have done, acccording to the statistical information recorded, in the days of King Solomon.

The loss in the "hog crop" in many of the States is considerable, and not compensated even by whisky. Six States (Maine, Massachusetts, New Hampshire, South Carolina, Tennessee and Vermont) produce less corn than they did ten years ago. The old States exhibit little increase of corn—scarcely equaling the marvelous growth of some single new State.

I have been furnished with the Ohio annual agricultural reports, containing statistical returns of that State—so creditable in matter and form that they deserve to be the model for her sister States—and these corroborate the positions assumed—that is to say, the fact of the increasing unproductiveness of our long cultivated lands. Ohio is a fair State to put on to the witness stand. She is wise, brave and rich enough to court the test, to declare the whole truth, in order to find a cure for any defects in time. This annual self-inspection—not less useful to States than to persons—discloses the real deficiencies, and all that is then needed is proper instruction as to the remedy. Ohio is the eldest of the great Western States—large, populous, and neither old and worn out, nor young and undeveloped—the golden link between the old States and the new. Her fate may be anticipated by some, and will be followed, perhaps, with unequal steps, by all the rest. It will not soil a phrase of politicians to say, "as goes Ohio so goes the Union."

By the reports referred to it appears that 87,821 acres more land devoted to the culture in 1858 than in 1850, produced 1,454,412 bushels less wheat. (*Vide* Report 1854, p. 542.) The average product is also stated to be 11.35 per acre in 1858, against 18.78 in 1850, or a falling off of nearly 7.50 bushels per acre. That this is not confined to one season may be seen by taking the whole eight years after 1850 together, and the falling off was over four bushels to the acre for the entire crops. This proves the steady and unmitigated decline as to the whole State, whatever particular localities may exhibit, in the capacity of the soil, at the yearly rate of nearly one bushel per acre. The substances necessary to the production of wheat are in the processes of being annually exhausted, and they are not returned, though not lost to the world where they go, for we have long fattened British Durhams, according to the magnitude of our exports, and, I regret to say, British hate, by any diminution of our imports. It is no answer to say that the profits of the farmer have not diminished because prices have advanced in even a greater ratio than the diminution of the crop. The fact will still remain that the land grows less and less capable of supporting its population. Other fields may open, but this is closing. Starvation, though distant, is still visible in the skeleton at the end of the road. Land that will not produce corn or wheat may be devoted to some other crop, but the product is likely to be less valuable. It may sustain cattle, but not men. Grazing, properly conducted, may renovate the soil, but that husbandry, while it requires fewer numbers in its conduct, also supports fewer numbers. Its profits may be gratifying to the few, but they are banishment to the many. In China few animals are raised for slaughter, because all the land is needed to supply food for man. In Ireland their live stock has recently increased, but Irishmen have sadly dwindled. Drive out men, and you give room for brutes; but the change is not pleasant to contemplate.

It must be remembered that even the old States have a vast amount more of lands improved now, and a greater population, than they had ten years ago, and from these causes alone should have made a large increase of crops. But it would appear that these new lands and larger forces are becoming necessary to counterbalance the deterioration of the older fields. It is a striking fact that the increased production is derived from new lands, either in the new States or lands freshly cultivated in the old States. The long cultivated lands appear to be declining, at the very time when they should be advancing to a higher and more remunerative fertility. Our grain growing region is rapidly retreating westwardly. The States that now furnish corn to any extent beyond their own consumption are few in number and destined soon to be less.

That there is a gratifying advance of agricultural wealth within the past ten years, in many respects, is true, but with our magnificent opportunity and with an eye on the future, it certainly is not wholly satisfactory. We are in the rear of Europe, and that will never be satisfactory. The

English have what they call exhausting, restoring and cleaning crops. But we seem to have got so far only as to adopt the exhausting crops. There capital finds the most solid security invested in land and its improvements. Here such enterprises spoil a man's credit on the exchange. The true system of farming would seem to be to make the land more fertile than it is in its natural state, and every succeeding crop better than the last. By our mode the earliest crops are seldom subsequently equaled, and the last are apt to be the worst.

The proportion of population of the United States engaged in agriculture in 1840 was 77.4 per cent., but in 1850 it had fallen to 44.69 per cent. In 1860 the per centage is doubtless still less, as we find the increase of population much the largest in towns and cities, and in some rural districts the population has positively diminished. Taking the cities and towns with over five thousand inhabitants, the increase has been 60.43 per cent., and all the rest of the country only 31.96 per cent., or the former nearly double of the latter. If all the villages, towns and cities should be included, the fact would be shown in a much stronger light. This tendency to desert the rural districts and to shun manual labor can only be checked by making the country more attractive and more remunerative. The architectural monuments of opulence have risen in the towns and cities at the expense of the more solid and pervading evidences of a nation's prosperity, which are to be mainly found in the unostentatious improvements of the buildings and cultivated fields of the rural population.

I will not attempt to enumerate what has been done and is now in progress by European nations to promote agricultural education. It would occupy too much space. It is enough to know that they all seem eager to place their people ahead in the great race for the mastery. Our nation has been the first to test the value of iron-clad ships, but we lag immeasurably behind in improving the resources necessary to support such ships. The efforts of our foreign rivals are on the most liberal and persistent scale, and have thus far been in the main successful, and this is proven by their continued annual appropriations for this object. Among these governments, that of Louis Napoleon, as usual, occupies a prominent position. Many crops in France, within a few years, have been doubled; some have been quintupled; live stock has been doubled in number and value; and, while the profits of farmers and the wages of laborers have also been doubled, taxes on land have been actually diminished. The Second Empire may not claim credit for the whole of these improvements, but the services of the present Emperor have been so great, according to a late writer, "that one of the charges brought against him by his uncompromising opponents is, that these benefits have caused the nation to forget even that loss of freedom by which they have been purchased."

Coveting, as we do, American freedom, let us show that it is not held with the smallest diminution of other blessings, material or educational, so dearly purchased under other forms of government.

Ireland, with a soil of much more natural fertility, and a climate of far greater salubrity than England or Scotland, has been oftener threatened with the perils of famine than any other civilized country of the world. All this is traceable to bad farming, through a system possibly forced upon the people by political and social connection with England. They have raised grain crops in abundance, and some cattle; but too poor to consume them at home, these have been sent to England, while potatoes remained the chief fare for gaunt Irish laborers. Even the bones of the few cattle slaughtered at home, carefully gathered, have been sent to England, where science and capital had made the discovery of their agricultural value.

After the failure of the potato crop in 1847, in the brief period of about eight years, cholera and emigration reduced the population of Ireland from eight millions to six millions, or fully one-fourth, and those who remained were either too feeble to arrest the downward tendency of their soil to sterility, or they were preparing to emigrate, and therefore scourge the reluctant soil to bring forth one harvest more, and then, farewell! England could have borne the exodus of the Irish, but the vanishing rent was less tolerable. The Fishmongers' Society and others owned estates there, and these must be rescued. England deserves praise for the hearty manner with which she undertook the task of improving Irish farming and Irish farmers; and it is to be noted that no capital was used more effectively than that which has been and is being expended for the establishment and support of agricultural schools and colleges. Already the face of the country presents a nobler aspect; the number of cattle raised has been largely augmented; labor is better paid and fed; and we are now beginning to recognize Ireland as in fact the *Emerald* Isle, or the first grass country of the world.

Whether our own country is following the cast-off system of Ireland or not, is a grave question. If we export to England the virgin products of our soil—and those the most exhausting crops cultivated, the cereals, tobacco and oil cake—it is a process which makes England a garden at the expense of American farms; and we may well forebode the day when it will be no longer possible to furnish cheap food to our multiplying and dependent millions, and certainly not possible to respond

to the foreign demand of either commerce or famine. If it be true that the man who sells hay will soon raise no hay to sell, because there is no return of manure, the same result is equally apparent from the export of other crops, upon the consumption of which on the farm the reproductive energies of the soil depend for supplies.

Should no effort be made to arrest the deterioration and spoliation of the soil in America, while all Europe is wisely striving to teach her agriculturists the best means of hoarding up capital in the lands on that side of the Atlantic, it is easy to see that we are doomed to be dwarfed in national importance, and not many years can pass away before our ships will be laden with grain, not on their outward, but homeward voyage. Then, with cheap bread no longer peculiar to America, our free institutions may be thought too dear by those of whom even empires are not worthy—the men with hearts, hands and brains—vainly looking to our shores for life, liberty and the pursuit of happiness.

There is and can be no mode by which the resources of a country can be so fully developed as by educating the vast numbers who are to devote their lives to agricultural employments, as tillers or owners of the soil. By this means each man is trained to bring into action his whole mental and physical force. The immense loss of power through ignorance is saved. The factory girls in America receive two or three times the pay that the same class obtain in other lands; but this is not all the generous gift of the employers, for they secure in the better educated American girl a superior and more valuable labor. Intelligent labor is found to be hardly too dear at any price. This is eminently true in agriculture. A dull, uncultured man, though physically a giant, does little work for which brute power might not often be easily substituted. He may move mountains, but the inevitable mouse only appears. The skilled and thoroughly trained farmer is sure to harvest larger crops and with less labor than his unskilled and untrained neighbor. Science, working unobtrusively, produces larger annual returns and constantly increases fixed capital, while ignorant routine produces exactly the reverse.

The mere dispersion of population over a wider territory improves neither the soil nor the cultivators of the soil, but both for the time are made rather the worse by experiments and theories which new conditions ever impose.

There are evils in an extremely dense population, but, except in cities, our country as yet has reached no such point. The rural population is nowhere crowded. The new Territories, sparsely settled, naturally desire accessions. Their unoccupied spaces furnish none of the means to support a State. If they suddenly make drafts upon the old States to fill their vacant spaces, the aggregate wealth and power of the country is weakened, for not so much is contributed to the new as has been subtracted from the old. The dispersion tends to destroy, not markets merely, but that skill a dense population, by a division of labor, always assembles. Whatever advantages were held under the old condition of things have been abandoned, while whatever advantages may result from the new order of things are yet distant and imperceptible.

It is the destiny of many young men of the East to find homes in the West. They can only be retained on the Atlantic slope long enough to receive their education, and that will not repress their enterprise for travel. Foreign emigration and Eastern combined, will bring gray hairs into the western prairies full soon in the life of a nation. "In every nook of the world where any good is to be got," it is said, "there is to be found a Scot, a rat and a Newcastle grindstone," and perhaps it might be added, *a Yankee and a jack knife*. Our young men will go; we expect them to go; but let them go laden with the spoils of the school house and college—a capital worth more than gold—and then they will prove of priceless value to our common country, wherever ultimately located—proudly and forever wearing the name of an American citizen.

It is of the highest moment that at this time we make no blunder in the guidance of the industry of the country, when all its resources must be taxed more severely than ever in all our previous history. While we are compelled to place most unusual burdens upon the people—none of whom can escape—let us pass one act they will all hail with delight. If they are made to carry weight, let them have some chance to increase their strength. The people are called upon unceasingly to do something for their Government, and they do not fail to respond, because it is their Government; but it would not chill their patriotism if the Government should for once do something for them.

Undoubtedly agricultural chairs or professorships should be founded in all our colleges and universities. Every man owns or expects to own land at some period of his life, and it could certainly do him no harm to be taught how to manage landed property. If made a part of the regular course of studies, an opportunity would be given to acquire information that might, in the changing circumstances of the world, prove of the highest value in practical life. But these professorships, as important as they are admitted to be, would not satisfy the whole demand. The present institu-

tions are hardly more than equal to the task of supplying the learned professions, so-called, with their annual reinforcements, while others are wanted where the idea of labor shall be uppermost, and where the *esprit du corps* of those instructed will seek highest honor in no other direction.

It is true, nearly all the more modern sciences are more or less related to agriculture or the mechanic arts, and they are liberally recognized by professorships in most of our institutions of learning; but, as generally taught, there is little special application to agriculture or the arts. It is too far removed from any expectation of practical use, and, as with some merely ornamental branches, only so much of technical knowledge is given as it might be unpardonable for a gentleman to be without.

The prejudice against educated farmers arises from the fact that, while those usually styled such may be truly educated in some sense, they have no real agricultural education, and are no more fitted for their duties in that sphere than the seronaut is fitted for a railroad engineer. When we have a race of educated farmers—men who have parted with their conceit for absolute knowledge—practically illustrating their education by their works, they will not turn out sailors on horseback, as it may be admitted some of the so-called book farmers have done. Merely practical men have looked at science as though it were a godess in a cloud, to be worshipped only by fanatics and afar off, when it is really a handmaid, beautiful, and busy everywhere at saving labor and capital.

Men who are not farmers often by choice or chance have estates come into their charge, and they find themselves entirely unequipped—having had little theory and no practice—to manage them successfully. Such estates must be disposed of for the most any neghbor chooses to give, or the owner will have an outlay and not an income while it remains in such hands. This mortification could not happen if only general ideas of farming economy were more widely taught. That man only is independent who feels able to support himself and family by the plow whenever other avocations are closed; and he may feel sure his taste has become vitiated if he indulges the idea that other avocations are more fruitful of health, honors, or happiness, than that of the genuine American farmer. The business of agriculture is sometimes thought to be uninviting by those in other walks of life, and they shun any investigations of the great truths which underlie and surround it, as much as they would shun instruction in the craft of a tinker, lest they should some day be called upon to mend their neighbor's pot.

The experience of other nations in war, in arts, and in the sciences, is unhesitatingly resorted to, and all progress therein is appropriated as common property of the world; but in legislation, philosophy, and education, reform based upon the most valid tests of foreign examples is treated with the coldest hospitality. It is not a sufficient reason because agricultural and military education has been extensively ingrafted upon the systems of other nations, that the same policy should be transplanted here; but confuting the stupid idea that success is impossible, it is a reason why we should earnestly investigate the subject, and, if our necessities show that we stand in as much or more need than those who have successfully led the way, it is a strong argument why the policy should be adopted.

Popular common school education has been slowly combating the prejudices of the world for generations. Starting from the Sunday afternoon catechism in Protestant Europe and America, it required two centuries to arrive at its present condition. At this moment the cause is receding in Prussia, but gaining in England and elsewhere. We mock the timid pace with which other nations adopt our plan of universal education, but forget what laggards we are in an adjoining field, where they appear so much in the advance. Whoever is at the lowest round of the ladder manifests the least inclination to rise, and those highest up have the most ambition for still greater achievements. Among the motives which should stimulate us is the desire to improve man himself, and added to this, we have all that moves our grea European competitors—namely, the increase of wealth and power. Manufactures take no step until agriculture produces a surplus beyond what is required for its own consumption, and from this surplus arises raw material and cheap bread, which make the arts and manufactures flourish. From these results commerce. Trade derives all its support from the basis furnished by agriculture and manufactures. Then follows the necessity of military and naval protection. In a free Government we have proved—notwithstanding some, "in time of temptation, fall away"—that patriotism is spontaneous; but doubtless many valuable lives would have been saved in the progress of this plague-spotted rebellion had we not so long assumed that military discipline was also spontaneous. If ever again our legions are summoned to the field, let us show we are not wholly unprepared. These colleges, founded in every State, will elevate the character of farmers and mechanics, increase the prosperity of agriculture, manufactures and commerce, and may, to some extent, guard against the sheer ignorance of all military art which shrouded the country, and especially the North, at the time when the tocsin of war sounded at Fort

Sumter. This latter view becomes more important from the suggestive discovery that in any grave controversy the old Governments of the world are not our friends. Our obituary is the only service for which they manifest any alacity. They would see us humbled. Clearly our growth is an eyesore to aristocracy. In peace they would buy and sell with us, but in war they would sell us and buy our enemies. Commercially they find us, when docile, at least useful; but politically they would shun us as a pestilence that walketh at noonday. We can only be secure at home and abroad by being ready at all times to "ask nothing but what is clearly right, and submit to nothing wrong," and with Jacksonian nerve accept any responsibility of our position. The true way to nurse patriotism, after having institutions really worth a struggle, is to inspire our people with confidence, by giving them proper training, that they are equal to their mission, and that failure is impossible.

Some may argue that the institutions proposed will turn out unsuccessfully. It may be that they will, but the object more than compensates the risk. If put into incompetent and unworthy hands, they will of course fail, and so would free government itself. But this would impute an imbecility upon the legislatures of the several States they have not deserved. Let us not believe they will prove inert, helpless, or wanting in capacity to develop so palpable a boon. I have faith in the sagacity of the people to profit by the experience of the world, and that they will mold these institutions in a form, and place them in charge of such men as will secure permanent usefulness and enduring honor to the whole country.

THE AGRICULTURAL COLLEGE ACT.

An Act donating Public Lands to the several States and Territories which may provide Colleges for the benefit of Agriculture and the Mechanic Arts.

Be it enacted by the Senate and House of Representatives of the United States of America, in Congress assembled, That there be granted to the several States, for the purpose hereinafter mentioned, an amount of public land, to be apportioned to each State, in quantity equal to 30,000 acres for each Senator and Representative in Congress to which the States are respectively entitled by the apportionment under the census of 1860, provided that no mineral lands shall be selected or purchased under the provisions of this act.

SEC. 2. *And be it further enacted,* That the land aforesaid, after being surveyed, shall be apportioned to the several States in sections or sub-divisions of sections not less than one quarter of a section; and wherever there are public lands in a State, subject to sale at private entry, at one dollar and twenty-five cents per acre, the quantity to which said State shall be entitled shall be selected from such lands, within the limits of such State; and the Secretary of the Interior is hereby directed to issue to each of the States, in which there is not the quantity of public lands subject to sale at private entry, at one dollar and twenty-five cents per acre, to which said State may be entitled under the provisions of this act, land scrip to the amount in acres for the deficiency of its distributive share; said scrips to be sold by said State, and the proceeds thereof applied to the uses and purposes prescribed in this act, and for no other use or purpose whatsoever; provided, that in no case, shall any State to which land scrip may thus be issued, be allowed to locate the same within the limits of any other State or of any Territories of the United States; but their assignees may thus locate said land scrip upon any of the unappropriated lands of the United States subject to sale at private entry, at one dollar and twenty-five cents an acre; and provided further, that not more than one million acres shall be located by such assignees in any one of the States; and provided further, that no such locations shall be made before one year from the passage of this act.

SEC. 3. *And be it further enacted,* That all the expenses of management and superintendence and taxes from date of selection of said lands, previous to their sale, and all expenses incurred in the management and disbursement of the moneys which may be received therefrom, shall be paid by the States to which they may belong, out of the treasury of said States, so that the entire proceeds of the sale of said lands shall be applied, without any diminution whatever, to the purposes hereinafter mentioned.

SEC. 4. *And be it further enacted,* That all moneys derived from the sale of lands aforesaid, by the States to which the lands are appointed, and from the sales of land scrip hereinbefore pro-

vided for, shall be invested in stocks of the United States, or of the States, or some other safe stocks, yielding not less than five per cent. upon the par value of said stocks; and that the money so invested shall constitute a perpetual fund, the capital of which shall remain forever undiminished (except so far as may be provided in section fifth of this act), and the interest of which shall be inviolably appropriated by each State which may take and claim the benefit of this act, to the endowment, support and maintenance of, at least, one college, where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the Legislatures of the States may, respectively, prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life.

SEC. 5. *And be it further enacted*, That the grant of land and scrip hereby authorised, shall be made on the following conditions, to which, as well as to the provisions hereinbefore contained, the previous assent of the several States shall be signified by legislative acts:

First: If any portion of the fund invested, as provided by the foregoing section, or any portion of the interest thereon, shall, by any action or contingency, be diminished or lost, it shall be replaced by the State to which it belongs, so that the capital of the fund shall remain forever undiminished; and the annual interest shall be regularly applied, without diminution, to the purposes mentioned in the fourth section of this act, except that a sum, not exceeding ten per centum upon the amount received by any State under the provisions of this act, may be expended for the purchase of lands for sites or experimental farms, whenever authorized by the respective legislatures of said States.

Second: No portion of said fund, nor the interest thereon, shall be applied, directly or indirectly, under any pretense whatever, to the purchase, erection, preservation or repair of any building or buildings.

Third: Any State which may take and claim the benefit of the provisions of this act, shall provide, within five years, at least, not less than one college, as prescribed in the fourth section of this act, or the grant to such State shall cease; and said State shall be bound to pay the United States the amount received of any lands previously sold, and that the title to purchasers under the State shall be valid.

Fourth: An annual report shall be made regarding the progress of each college, recording any improvements and experiments made, with their costs and results, and such other matters, including State industrial and economical statistics, as may be supposed useful; one copy of which shall be transmitted by mail free, by each, to all the other colleges which may be endowed under the provisions of this act, and, also, one copy to the Secretary of the Interior.

Fifth: When lands shall be selected from those which have been raised to double the minimum price, in consequence of railroad grants, they shall be computed to the State at the maximum price, and the number of acres proportionally diminished.

Sixth: No State, while in a condition of rebellion or insurrection against the government of the United States, shall be entitled to the benefits of this act.

Seventh: No State shall be entitled to the benefits of this act, unless it shall express its acceptance thereof by its legislature within two years from the date of approval by the President.

SEC. 6. *And be it further enacted*, That land scrip issued under the provisions of this act, shall not be subject to location until after the first day of January, 1863.

SEC. 7. *And be it further enacted*, That land officers shall receive the same fee for locating land scrip issued under the provisions of this act, as is now allowed for the location of military bounty land warrants under existing laws; provided, that maximum compensation shall not be thereby increased.

SEC. 8. *And be it further enacted*, That the Governors of the several States to which scrip shall be issued under this act, shall be required to report annually to Congress all sales made of such scrip until the whole shall be disposed of, the amount received for the same, and what appropriation has been made of the proceeds.

Approved July 2, 1862.

"Agriculture is the basis of our prosperity." So says the politician, when making stump speeches to too easily satisfied farmers. It is a truth tacitly admitted by all, yet practically its importance is seldom acknowledged or comprehended.

Agriculture is the great producing source upon which all other pursuits are dependent. In time of war, it is the "back bone" of the

nation. The best soldiers are furnished from its ranks, it feeds the armies, furnishes the material to clothe them, and, in a great measure, the money to pay them. According to the Patent Office Report on Agriculture for 1861, three-fourths of the people of the United States are agriculturists. It has been estimated that nine-tenths of the fixed capital of all nations is invested in agriculture. Statistics collected in the State of New York show, notwithstanding the enormous wealth of the metropolis, that the agricultural interest pays four-fifths of all the taxes. England is called a manufacturing country, yet the returns of her income tax show that two-thirds of all the net income from the industry of the nation is derived from agriculture.

Daniel Webster, after observing, with his keen intellect, the prosperity of agriculture in England, thus speaks of its great relative importance: "No man in England is so high as to be independent of this great interest—no man so low as not to be affected by its prosperity or decline. The same is true, eminently, emphatically true, with us. Agriculture feeds us, to a great extent it clothes us; without it we could not have manufactures, and we should not have commerce. These all stand together like pillars in a cluster—the largest in the center, and that largest is agriculture."

An interest of such vital importance, underlying and contributing to the prosperity of all others, especially deserves the attention and action of legislators. Yet it is notoriously true that it is more difficult to obtain legislation in favor of agricultural improvement than almost anything else. Railroads, banks, and hundreds of money-making schemes, or "shaving institutions," can obtain the aid they want with comparatively little difficulty, while for the plainest necessities of agriculture, its friends must beg, often year after year, when the very aid asked for would contribute little, if any, less to the aggrandisement of the farmers themselves than to that of all other classes. Strange, yet true, when agriculture asks aid, the Government or the State is "too poor"—the propriety of the investment cannot be seen—or "the farmers will do well enough if let alone"—or possibly the real truth is, that the politicians, who generally rule, cannot see that they will be particularly benefited.

Our Government and the various States have been wise and liberal in providing for common schools, academies and colleges, and in the number of these we have surpassed most European nations, yet we are greatly behind them in institutions designed to teach the innumerable applications of science to agriculture, and thus encourage the prosperity and elevation of this noble employment.

In many of the older States of this Union the average product of wheat has decreased one-half in less than fifty years, while in Great Britain, during the same period, it has increased one hundred per cent. in consequence of more intelligent cultivation.

Stubborn facts are numerous in all the older States, and in some of the newer, showing that land has been measurably worn out, and the

great staples of the country diminished, by continual injudicious cropping. It seems to be a great law of nature, or, at least, it is a fact well supported by history, that the life and prosperity of nations, the number and intelligence of the population, freedom from disease, famine, crime and war, is generally in proportion to the ability of the inhabitants to produce an abundance of human food. Wherever that is deficient, the most direful calamities follow and the number of inhabitants is reduced.

Agricultural colleges are needed to teach farmers how to increase their crops without impairing the fertility of their fields, and how to restore the necessary elements when their lands have become degenerated.

It must be admitted that the State of Missouri, with all her superior natural advantages, is behind most of her sister States in agricultural improvement. The thriving young State of Iowa has greatly more numerous county agricultural societies; she has her flourishing State society, issuing annual reports—volumes replete with valuable agricultural information; and seven or eight year ago she planned and commenced providing for and building up an agricultural college and farm. A like greater advancement is apparent in Illinois and other States northward and eastward.

Recently the Legislature of Missouri has incorporated a State Board of Agriculture, which is designed to be the head of a systematic organization for agricultural improvement. It is the especial office of the Board to investigate and discuss all subjects relating to agriculture and the arts connected therewith as they may deem expedient, to disseminate among the people useful facts, discoveries, improvements and theories, by reports and essays, and to make such suggestions and recommendations to the Legislature, from time to time, as the interests of agriculture may seem to require. The organic law specifies that the Board shall make recommendations, "including especially agricultural education."

The law creating the Board of Agriculture was obtained and the organization completed in the face of the most serious obstacles, during the existence of civil war of the worst character within the limits of the State, showing, on the part of the loyal citizens of Missouri, an unwavering faith in the stability and permanence of the Government, and an untiring zeal for improvement in the most important branch of human industry.

The National Government, during the existence of the greatest rebellion ever known, found time to mature and pass "an act donating lands to the several States and Territories which may provide colleges for the benefit of agriculture and the mechanic arts." Missouri, by her Legislature, has accepted the terms and conditions of the grant, and becomes entitled to three hundred and thirty thousand acres of land, situated within her own boundary. It now becomes the duty of the Legislature to make provision for fulfilling the compact;

and it is the prerogative, nay, the imperative duty of the Board of Agriculture, as enjoined by the Legislature, to make recommendation concerning this most important subject. Few questions of greater interest, or more vital importance, or more far-reaching in its consequences, considering the future of a great State, ever have claimed or ever will claim the attention of our Legislature. The productiveness of our whole domain, the degree of progress which shall be made in the arts of life, the future development of our untold natural resources, in fact, the position and power of Missouri as a State, hang upon the decision. The time passed long since when the lands should have been selected, and an immense loss to the enterprise has been sustained in consequence. It is conjectured, with very good reasons, that the failure to accomplish anything thus far has been occasioned by the influence of local interests and petty jealousies. It is natural and commendable in men to be ambitious for the localities in which they are most interested, but when it is seen that such feeling is preventing the accomplishment of a great and good object of vast importance, every true patriot will yield his own preferences for the general good.

The object contemplated by Congress in the act donating lands, was, beyond a shadow of doubt, the establishment of independent colleges of a character distinct and radically different from the literary colleges. If it had been the object of the grant to increase or extend the facilities for instruction in any of the existing literary institutions, it would undoubtedly have been so stated; but such is not the fact. The language of the act plainly specifies a different purpose, namely, "the endowment, support and maintenance of, at least, one college where the *leading object shall be* (without excluding other scientific and classical studies, and including military tactics) *to teach such branches* of learning as are related to *agriculture* and the *mechanic arts*, etc."

Again, the grant was obtained through the exertions of leading agriculturists and earnest friends of industrial education. The position taken by such persons, from Iowa to Maine, as expressed through the various boards of agriculture, has been decidedly and emphatically in favor of distinct and independent organizations. It is true, that in New Jersey, Connecticut and Rhode Island, the agricultural schools, under the grant, have been connected with literary colleges, but the reason for so doing was that the fund derivable from the grant was too small to afford a prospect of success with independent first class industrial colleges in those small States.

In Maine, it has been a question whether the endowment would be sufficient to enable them to maintain an independent college. The Board of Agriculture of that State, however, has taken strong ground in favor of such an establishment as the object intended by the grant, as well as most to be desired. The Secretary of that board, in his report for 1863, says: "A cursory glance at, and a thorough examination

of the act of Congress, alike show that a separate existence best corresponds to the intentions of the grant; nor can any doubt exist that the agricultural college might be best conducted in this manner. Standing by itself, it will excite greater interest in the classes for which it was intended; will draw pupils more numerously from them, and will more readily and to a greater extent raise up for itself friends and benefactors. As a separate institution it will appear more conspicuously, both as the educator and the organ and representative of the industrial classes; nor will there be any peril of its being overshadowed or absorbed by any other."

The Massachusetts Agricultural College has been located in the immediate vicinity of Amherst College, but distinct from it; the citizens of the locality subscribing seventy-five thousand dollars to secure the location. The executive committee of the board of trustees, in a report to the Legislature, make the following statement:

"Amherst College has generously offered us the free use of her libraries, collections of natural history, chapel, and lecture rooms, and even the services of her professors, for ten years; and, although we have no thought of accepting, in their full extent, offers which imply a more intimate relation to that college than we deem it proper to form with any institution, we feel confident that the liberal spirit manifested by Amherst College, as well as the citizens of Amherst, may well assure us of that good fellowship which naturally exists between cultivated neighbors engaged in kindred pursuits."

In New York State, during some difficulty in regard to the location of the Agricultural College, the Hon. Ezra Cornell, a prominent agriculturist of Ithaca, in that State, came forward and nobly offered to donate to the institution $500,000, provided the Legislature would give it the benefit of the land grant and locate it at Ithaca. The Legislature accepted the offer with the conditions, and attached the name of the generous donor, naming it the "Cornell University."

Whether Missouri will take her true position among the great States of the Union in regard to this subject, and establish a first class institution upon an independent and truly industrial basis, which will be an honor to the State and the pride of her sons in all future generations, and which will command the confidence and inspire the faith of the industrial classes, for whose benefit it is intended, is the question to be decided by our Legislature. Let it not be said that the State is too poor to give anything for a purpose so important. The very men who pay most of the taxes will not admit it. It should be borne in mind that the State is rapidly filling up with an excellent class of citizens; that the tide of immigration is at the begining of the flood; that in a very few years Missouri will be populous and wealthy, and that permanent prosperity and wealth must depend primarily upon the farmer, the mechanic and the miner. No State was ever too poor to expend money judiciously for the benefit of her domestic industry. Missouri

can never become wealthy without a better development of her agricultural, mining and manufacturing interests.

With an eye to the glorious future of the State, it will surely be the wisest policy to lay the foundation for the Industrial College on the best possible basis, even if we have to begin with a small number of professors, and they have to live at first in log cabins. The necessary means need not long be wanting.

To divide the land grant, for the purpose of establishing mere professorships of agriculture in several literary institutions, as has been proposed, would be a disgrace to Missouri, and an evident violation of both the spirit and the letter of the law of Congress.

A farm and workshop will be a necessary part of the apparatus of an industrial college, and indispensable for practical instruction. The object of the land grant by Congress being to establish colleges "in order to promote the liberal and *practical* education of industrial classes, in the several pursuits and professions of life," all the means necessary for such practical instruction should be possessed by the college.

The college indicated by the act of Congress is essentially unlike any of the existing colleges in this state, they being properly literary institutions, having for their *leading object* the development and discipline of the mind, while the *leading object* of the Industrial College must be to prepare youth for the practical callings of life, and should be primarily designed and adapted for the education and training of pupils for the industrial pursuits in life, as stated by the act mentioned.

It must be deemed unwise and inexpedient to incorporate the Industrial College with any existing literary institution, for the reasons already given, and futhermore because a liability would in such case be incurred of an overshadowing influence from, or an ultimate absorption into, the institution to which it is attached. The professors of literary institutions have devoted their lives to quite a different style of education; they have little knowledge of the work of the industrial classes, and no sympathy with hand workers. They have not been known to be favorable to industrial education until since, quite recently, they have found it for their interest to become so. Whereas, the teacher who instructs pupils in the sciences which pertain to agriculture, should himself know what agricultural labor is, and be ready with practical applications on the soil to illustrate the laws which he teaches. The instructor who imparts to them a knowledge of mechanics, should know how to guide their hands in the workshop in applying these laws. In fact, the whole control, management and instruction of the Industrial College should, if possible, be in the hands of its known, earnest friends, in order to be successful in attaining the object designed, and to enlist the interest of the classes for whose benefit it is intended.

It is for such reasons that we should oppose the proposition to incor-

porate the agricultural college with the State University. There are important reasons in favor of locating it in the vicinity of such an institution, some of which have been mentioned. The most important reason is believed to be the fact that several branches—as, for instance, chemistry, mathematics, natural philosophy, physiology, etc.—would be taught in both institutions, and the united funds of both might be used in securing the best teachers and the best advantages in such branches. But all the advantages may be gained equally as well by an independent organization as by an incorporation with the literary school, while the latter would endanger the success, if not the very life of the industrial school.

If Columbia shall be deemed the best location for the Industrial College, on account of the advantage of the State University, or any other advantage, let it be so located, but let the organization, government and control of the industrial school be independent of the other. It is certainly difficult to see any important advantage to be gained to either school, legitimately, by incorporating the two, which would not be gained by separate organization, while, on the other hand, the most serious disadvantages may be feared in consequence of a connection.

It may reasonably be inferred that the industrial classes of Missouri will never be satisfied to have *their* college attached to a literary institution. The two are in a great measure incompatible, or at least so widely different as to demand distinct organization. It has generally been maintained by the literary colleges, that industrial schools were failures, except possibly in a few instances, where such schools were attached to literary colleges. We cannot admit this to be the true state of the case. There are many very prominent facts to the contrary; among them may be mentioned the school at Hohenheim, which was commenced in 1818, and is now generally admitted to stand at the head of the institutions for agricultural education in Europe; the Agricultural Institute of Weihenstephan, which holds the first rank in Bavaria; the Agricultural College of Cirencester, in England; the Albert National Agricultural Institution, near Dublin, Ireland, and the Pennsylvania Agricultural College, Michigan Agricultural College, and Maryland Agricultural School, of our own country. The Pennsylvania College has been eminently successful, while the schools of Michigan and Maryland have been quite as successful as the majority of literary colleges in their infancy. At all events, if there remains any doubt about the success of industrial colleges, the true way to determine the question is, not to put them in the hands of those who have no faith in their success, but in the hands of their most sanguine friends, and let them stand upon their own foundation and rise by their own merit, if rise they can.

Mr. Henry Colman, in his work on *European Agriculture and Rural Economy, from personal observation*, in 1844, wrote as follows: "It is quite certain that the course of education pursued at most colleges

and universities, is quite unsuited to qualify men for the common business and pursuits of life. Indeed, it would seem, in many cases, to operate as a positive disqualification; and men who may have distinguished themselves at our universities for their classical and scholastic attainments, are often thrown upon society as helpless and as incompetent to provide for themselves, or to serve the community, as children. We have small encouragement at present, I confess, to look for anything better. The system of education at our colleges and universities has undergone little substantial alteration for a century; and what is called classical learning, and the subtleties and puerilities of scholastic divinity, occupy as much attention as formerly, and hold a place in these ancient seats of learning so high in the estimation of those to whom the management of these places is entrusted, that there is little hope of dislodging them."

Honorable Justin S. Morrill, in a communication of May 25, 1865, says: "You will see by the terms of the act what was the purpose, and if fully carried out, it comprehends a first class institution of learning, on moderate terms, where useful learning will rather take the lead of the purely classic, but not to the exclusion of the latter. There should be enough of the military to do away with the necessity of a gymnasium. A farm should be attached, if possible, for practical illustrations."

Honorable J. W. Hoyt, Secretary of the Wisconsin State Agricultural Society, under date of June 16, writes: "I hail the organization of a Board of Agriculture for the newly made free State of Missouri, as an event of great interest. The resources of your State are vast and various, and a board of agriculture may be made the instrument of great good in the work of advancing her industry and placing her in the front rank of the great States of the Union."

He strongly disapproves the idea which had been entertained here of "dividing the fund," and says: "It will long be to small for the endowment of even one such institution as Missouri ought too have. Every man who has had to do with educational institutions, particularly with institutions of this class, requiring thorough instruction in all the various branches belonging to the departments of natural science, and likewise in their application to the practical arts, will emphatically indorse this position. One college, liberally endowed, ably officered and energetically managed, would be worth more to the industry of your State than a dozen half starved, sickly ones."

The following letter from Rev. Amos Brown, President of the People's College, in New York State, is entitled to great weight. He has probably devoted more time, for a series of years, to efforts in securing the donation of lands by Congress for agricultural education than any other man, and afterward to securing what he thought the best action in regard to it by the Legislature of New York State:

OVID, NEW YORK, June 22, 1865.

DEAR SIR: The word mechanic was employed in the act of Congress setting apart lands for the promotion of agriculture, etc. (section 1), because it is more specific than the word useful. In some view every art may be regarded as useful. It was thought, moreover, that the restricting clause, "one college, at least," would relieve the section in which it occurs of ambiguity. It surprises me to learn that the act has been by some persons construed to necessitate the establishment of more than one institution of the kind described. I am sure the author of the phraseology anticipated no such result, and I am glad that you are using your influence to counteract the bad effects of such a construction.

The history of the legislation to which you refer is brief. The Hon. Justin S. Morrill, who was, in 1858, Chairman of the Committee on Agriculture in the House of Representatives of the United States, was desirous to do whatever he might to promote the science of agriculture; and, as President of the People's College, I was, in the winter of the same year, deputed to visit Congress to ascertain how it would regard an application to set apart a portion of the public domain to practical education. He and myself co-operated to bring the subject to the notice of the two Houses of Congress, and in efforts to persuade the members thereof to a favorable consideration of it. The only documents pertaining to the transaction, as I believe, are Mr. Morrill's speeches to which you allude, and volumes of the *Congressional Globe* for the sessions of 1858–59–60 and '62. The entire grant to this State was, in 1863, voted to the People's College, at Havana, Schuyler county. Since that time, the Hon. Charles Cook, the animus of the institution, has been prostrated by paralysis, and the enterprise, by consequence, endanged. At its last session, our Legislature voted the grant to an institution to be established at Ithaca, in Tompkins county, on the condition, however, that Mr. Cook should not, within a period of three months from the date of this legislation, manifest a disposition to comply with the provisions of the act of 1863, by depositing with the regent of the University of the State a sum of money sufficient, in their judgment, to complete his undertaking. It is not probable he will deposit the money, and the grant, consequently, will go to the Cornell University.

Strong efforts have been made to parcel out this grant, but I think experience will justify the decision that it would be unwise to do so. I said in my arguments to the Committee of the Legislature, while they were debating this question of division: "One sun suffices very well to furnish to the world light and heat, but let it be divided into six or eight parts, and they would not at all suffice for the purpose. The waters of the Hudson, as now combined, serve well for an extensive navigation, but let them be separated into five or six distinct streams, and they would be valueless to this useful end." If you found distinct colleges, you must, of course, provide distinct libraries, apparatus, buildings and boards of instruction, etc., and, also, though you may attempt a separate purpose in each institution, you must employ men in each institution to do the same work, to a very large extent, as is done in each of the others.

My judgment, then, is, whether you study economy or efficiency, including the widest influence, that you should concentrate your energies on a single institution.

If, now, some one should ask why, if this be so, build another institution? Why not give the grant to a college established in the State?—my reply would be, that our existing colleges have for their leading object the development and discipline of mind, and that the act in question contemplates an institution the leading object of which shall be to prepare youth for the practical callings of life. These distict ends will be best reached, of course, by means suitably adapted to each.

If I have succeeded in answering your inquiries satisfactorily to you, I am more than compensated by the effect.

I am, dear sir, very respectfully, yours, etc.,

AMOS BROWN.

L. D. MORSE, *Corresponding Secretary Missouri State Board of Agriculture.*

Mr. Charles Stephani, of Belleville, Illinois, is a graduate of one of the European schools of agriculture. He makes the following interesting communication:

BELLEVILLE, ILLINOIS, December, 1865.

L. D. Morse, Esq., Corresponding Secretary State Board Agriculture:

In compliance with your request, I transmit below my views in regard to agricultural schools.

The knowledge of agriculture is an art, like every other, and is, therefore, divided into two branches—into the abstract and the concrete. In the abstract part of it the truths and the knowledge which our present age possesses are imparted or taught to the pupils, while in the other it is taught how that knowledge is to be practiced in particular cases. Therefore, we also divide the science of agriculture into two branches—theory and practice. In accordance with this, we also have two different kinds of colleges—a higher one, where only the theoretical knowledge of agriculture is taught, and a lower one, where it is practically applied. Such universities of agriculture are, in Europe, either kept separately for that purpose, or connected with arboriculture, mineralogic or the mechanical sciences. At these universities of agriculture, precisely as in all other universities, the natural sciences, the knowledge of the ingredients and preparation of the soil, of botany, breeding of animals, of agricultural implements and machines, of their practical application and of book keeping, are taught. Connected with them are experimental farms for each separate branch of agriculture, as far as they may be necessary to illustrate the subjects treated in the lectures. Such universities of agriculture are justly looked upon as the greatest promoters of progress in the agricultural sciences, but their establishment and maintenance is very expensive; so much so, that even in Europe we find very few of them, and one or two of them would be sufficient to meet the wants of the entire United States. The costs of the education of the pupils are likewise so heavy that they are only accessible to the sons of rich parents, or to such who, likewise, intend to become teachers in these branches. But the weightiest argument which can be used against these universities is, that they unfit their pupils for the simple life of a farmer, and that when they are to put their knowledge to the practical test, in the narrow limits of their own homes, they are too often led into costly experiments, and into enterprises which may harmonize with those from whom they have just been removed, but are not applicable to the narrow limits of their homes and means. The second class of agricultural colleges are the so-called agricultural schools. In these the pupils are also initiated into the theoretical knowledge of agriculture, but in which the practical appliance of them is kept principally in view. The object of such schools is to educate men who are capable to fill to perfection the station of a practical farmer, who are competent to further educate themselves, and at the same time be an example to others, worthy of imitation. This object can only be reached by learning thoroughly all the labors which are to be performed on a farm, by acquiring the necessary knowledge of the qualities of the soil, of plants, of animals, agricultural implements and machines, and book-keeping, and by a strictly moral education; these all to be acquired by daily participation in the labors and household duties of the teacher. To pass through a course in one of these schools three years are required. The conditions under which pupils are received are, generally, that they have passed their fourteenth year, are healthy in body and mind, and have had at least a common school education. The first year the pupils are only made acquainted with the necessary manual labor in the garden, nursery and field; in the treatment of domestic animals, they also receive theoretical instruction three hours in each day. The second year they must learn the management of animals, are instructed in the use of agricultural machines and implements, and receive two hours in summer and four hours in winter of theoretical instruction. The third year the time is divided between theoretical and practical instruction, and the older pupils must now assist in teaching the younger ones.

Such practical agricultural school is managed by a director, who is the first teacher. He is also the overseer of the farm and of the common household. He is assisted by a teacher in the natural sciences and mathematics, and by a foreman for agriculture and the management and breeding of animals, and also one for the nursery, garden and vineyard, with a third for the dairy and other branches of economy. Connected with the establishment is an experimental farm, where all new products and inventions are tried; also, a farm proper, with the necessary animals, implements and machinery, which is intended to work for profit, and of which the director of the college is also the renter. If such a college is once properly established, with from one thousand to fifteen hundred acres of arable land, the profits from the farm, together with a moderate remuneration for the board of pupils, should be sufficient to meet the costs of the whole; so that the State would have only the expense of first establishing the college, and, perhaps, the salaries of the teachers during the first few years. The merits of these agricultural schools are more and more appreciated. The education which the pupils receive is simple, practical and cheap, The young farmer is not made into a student or book worm; can easily and naturally return to the small compass of his own home avocations, and apply his acquired knowledge to them; and yet he acquires sufficient theoretical knowledge of his profession to enable him to further educate himself on strictly rational principles. And, furthermore, these institutions alone enable parents who live in the city, and who wish to have their boys educated for the glorious profession of agriculture, to do so on strictly moral and practical principles.

CHARLES STEPHANI.

INDUSTRIAL UNIVERSITY.

The following article, by Mr. John H. Tice, the Recording Secretary of the Board of Agriculture, and a veteran in the cause of education, should be read with great interest:

The question of establishing a University for the education of the industrial classes, is one that is second to none that can come up for discussion, decision and action. It is a new question, not only to the people of this State, but to those of all the States, and hence it is not well understood anywhere. It is, however, not a question that involves a doubtful experiment, or of whose utility there is a diversity of opinion. All seem to concur in its utility, but seem perplexed in devising the means for attainment of the end. The Legislatures of the different States who have the matter of establishing these colleges under their control have, with rare exceptions, shown but little wisdom and foresight in their acts; more, however, in what they have not done, than what they have done. Possibly, this may be for want of sympathy with the classes for whose benefit these institutions are to be established, and who by them are to be elevated into intellectual and scientific equality with those belonging to the boasted "learned professions." Where this has not been the case, probably they have been befogged by the chopped logic of presidents and professors of dilapidated colleges, who want to be hitched on to the industrial college fund to set them on their legs again. But the great fault of non-action or mis-action is owing to the fact that a controlling majority of the Legislatures everywhere are mere politicians. From their standpoint every question has to be decided so as to retain them in power. The question with them is, not how can the public interest best be subserved in this matter, but how can it be disposed of so as to command the most votes for us? In this national donation for the education of the industrial classes, they see nothing except *douceurs* to be divided amongst their constituents, to secure their votes now henceforth and forever. Thus, the magnificence of the National Government is in a fair way to be diverted from its sacred purpose, and to serve only for getting up rivalries and scrambles between pot-house politicians for the nicest and largest number of sugar-plums. Unfortunately, as our Legislative bodies are constituted, the industrial classes are not sufficient in number, or where they are, wield not sufficient influence to give the proper legislative direction to best secure their own interests, nor even enough to prevent the squandering of the national bounty. It behooves, then, every one to cry aloud and spare not, before the iniquity is perpetrated, and while yet it is possible to save it for the sacred purpose it was donated. But to save it and remit it into the hands of those whom it is to benefit, is not enough. They want enlightenment what to do with it, so as to secure the greatest amount of good to themselves and their children. There is a national palingenesia taking place. Not the least means in this national regeneration, is the thorough training and scientific education of the industrial classes. Behold, old things are passing away, and all things are becoming new. The period so long dreaded by the aristocrat and oligarch, when the farmer and mechanic "would lay their huge paws" upon the statute book, and speak through the press, the pulpit and the forum, with a voice and an authority that will be heard and must be respected, is near at hand. To hasten its advent, the industrial producing classes must only be true to themselves, take educational matters into their own hands, and not trust them to those who are, to say the least, indifferent, if not inimical to their moral, intellectual, social and political elevation. Light is, therefore, wanted, to act intelligently and understandingly on this matter. The question can come up but once, and if wisely disposed of, will carry untold blessings to every citizen of the State, whether producer or consumer; and if unwisely, mischief equally as wide-spread and far reaching. Take care that no error is committed, because, as far as national aid is concerned, the error will be irremediable. Start wrong, and you will always be wrong. Whereas, by starting right you can always keep right.

Industrial colleges, although new in America, have for more than half a century been established on the continent of Europe, especially in Germany. Considerable experience has therefore been had, and, to a certain extent, that experience is valuable to us. It must, however, be borne in mind, that the polity of European States differs from American polity. There the industrial classes are "the mudsills" of the social edifice; in America they are the edifice itself. The training in European industrial colleges corresponds with the social *status* of their pupils, and is of more limited range than what it must be in America. There are, however, industrial schools in Germany, which are nearly polytechnic in the scope of the sciences taught. In all the nations of Europe, there is, however, not one that is connected with any other college, university, school or academy, unless we except that at Jena. In the United States the best one, the Pennsylvania Agricultural College, is an independent institution, and the next best, the Michigan Agricultural University, is the same. In New York, by the munificence of one of its citizens, Ezra Cornell, who, to save the agricultural fund from being

squandered in bolstering up rotten colleges, offered $500,000 if the State would establish an independent University. Hence, the "Cornell University" at Ithaca. It becomes those who are so clamorous for giving the agricultural fund to dilapidated colleges or universities, to show one where it has been done that is a success. This they cannot do. A successful college does not want it, and an unsuccessful one ought not to have it. This ought to be a sufficient answer, were even the conjunction feasible or free from questions of practicability. The object in donating the funds was to establish special colleges for teaching practically the art and theory of industrial pursuits, together with all the sciences pertaining or relating to these arts. A college, to do this efficiently, (and that is what it must do) must make the teaching of these arts and theories specialties. It cannot confine its pupils to the recitation room; it must go to the fields, the orchard, the cattle yard, the barn and the workshop for illustration and practice. Such a college must change its character, and become wholly an industrial one, or, if it holds on to its literary character, fail to answer the purposes of the industrial classes. There are other objections, equally potent, interposing insuperable objections to such a conjunction, which we cannot enumerate, and confine ourselves to the limits prescribed for this article. We therefore reluctantly leave them, and hasten on to our main purpose. After availing ourselves of all the light European experience has afforded in establishing and conducting these colleges, and the limited experience in America, we are still thrown pretty much upon our own resources, and have to work out our own salvation. Much work had to be done to prepare the way for establishment of these colleges. For many years there have essays been written, and lectures delivered upon the neccessity and utility of these colleges. The National Legislature was importuned for aid. But Congress was then dominated and controlled by an oligarchy adverse to the industrial classes. Not only adverse, but it considered them menial and dangerous, if educated and trusted with political power. Therefore, nothing was or could be done. It is the glory of the first Congress that was free from the incubus of slavery, that it inaugurated a new era, by making a liberal donation for the establishment of industrial colleges. Three years ago last July that act was passed, and five years are allowed for the establishment of these colleges by the States. Those States failing in that time to establish its college forfeits their interest in the donation. In ordinary times, five years would have been ample time for the States to act; but the earnest times and momentous events that have crowded upon, and have occupied the minds, hands and hearts of the American people, have made it an unfavorable time for discussing and settling questions eminently relating to peace. With the conclusion of the war, the people are now turning to rearrange their industrial pursuits, and adjusting them so as to secure the fruits to themselves and posterity of the glorious triumph achieved by the armies representing progress, civilization and freedom. By the act of Congress of July 2, 1862, a donation is made to every State of 30,000 acres of public land for every Representative and Senator such State has in Congress, provided such State shall accept and comply with the conditions of the donation, amongst which is that of establishing, within five years, an industrial college. These lands are to be located within the State, if there are any public lands. If there are none, then land scrip is to be issued for the number of acres the State is entitled to. Missouri, having nine Representatives and two Senators in Congress, is therefore entitled to 330,000 acres. And as there are yet ample public lands within the State, this number of acres can and must be located within her border.

Our State Legislature has accepted the donation, and signified its acceptance to the proper Department at Washington, as required by the act of donation. It also, on the 11th day of December, 1863, passed a concurrent resolution, requesting the Governor to procure from the Commissioner of the General Land Office an order directing the Registers of the several district land offices in this State to withdraw from market any of the public lands subject to private entry, that may be selected by authority of this State, under the grant of Congress for the endowment of colleges for the benefit of agriculture and the mechanic arts, whenever said Registers shall be notified of the selection of any of said lands by the persons authorised by this State to select the same. That Legislature, however, failed to establish a board of commissioners or creating any agency or agencies authorized to make selections of these lands, and appropriating money for defraying the expenses of such agent or agents.

Up to the present writing—December, 1865—there has been no law passed and agents appointed to select these lands, though a bill is pending before the Legislature now in session for that object. The return of peace and the abolishment of slavery has turned an unprecedented flood of immigration into the State, which is fast absorbing the most valuable of the public lands, and by the time the State gets its snail-paced institution for locating the lands in operation, but little valuable land will remain.

The intrinsic value of the Congressional donation is yet unknown, and will remain so until the lands are selected and located. The long delay in selecting these lands has probably reduced their

value to about the value of agricultural land scrip, which is about 80 cents per acre. If the lands are, even at this late day, promptly located, possibly in a year or two the Congressional price, $1.25 per acre, may be realized. This estimate, I believe, will be above the mark if the lands are forced immediately into market. A delay of four or five years may realize that, and perhaps a little more. In the meantime, what becomes of our agricultural college, which must be established inside of eighteen months?

Some friends, of sanguine temperament, have figured the price up to five dollars per acre, and consequently that the fund will be $1,650,000. My highest estimate gives only one-fourth of that, say $412,500. My reasons for the estimate are as follows:

First. The Government is now granting free homesteads on all its public lands to persons who will settle on the same.

Second. The public lands in Missouri have many times been culled over, and what remain are at best of but third or fourth rate quality in good localities.

Third. The best public lands in the State are remote from navigable rivers, or railroads either built or projected.

Fourth. These lands are not yet located, and no one knows when and where they will be, nor what will be their character.

Taking all these facts into consideration, together with the uncertainty of finding lands of any value, I, for one, will be well satisfied if my estimate is realized. I am fearful it will not be, but will be gratified if the amount reaches even beyond the most sanguine expectations. One thing is certain: no legislative action for the present should be had that contemplates spending more money annually for sustaining the college than the probable amount of interest on my estimate—say about $25,000. From an estimate hereafter to be made, it will be seen that no institution of any respectability or with any pretensions to secure public confidence can be maintained for less than that sum. If the fund does not yield that amount, let the State make up the deficit; if more, let more ample provisions be made and greater educational facilities be provided.

The extent of the annual means, according to my estimate, (which is doubtful of being realized) is about $25,000. To realize this the fund must be made to yield six per cent. per annum. This will require better financiering than the State has shown in the management of seminary and State school funds, which have not yielded more than three per cent.

The division of the fund, as proposed in some quarters, so as to establish district agricultural schools, demands the most serious consideration. It would be very desirable to have an agricultural college or academy in every county.. But the question is not what is desirable, but what can be done with the limited means? If we cannot place a college at every man's door, must we place none at any man's door? If we cannot have one in each county, shall we have none in the State? Let any candid man look at the amount of annual income and the educational scope these colleges ought to cover, and say whether there will be any more than will support one respectable institution? If there is not, shall we have one efficient and respectable institution, or a half dozen poor, feeble and inefficient ones? Shall that which, if put in one institution, will make it beneficial to all, be divided among so many that it will benefit none? The expenses of first class colleges everywhere show that the income of this fund will be barely sufficient to sustain one respectable college, and to do this two hazardous assumptions have to be made: First, that the Congressional price per acre will be realized; and, second, that the sum can be made to yield six per cent. interest.

The St. Louis Public High School has cost, on an average, $12,000 per annum, and the current year it will not be less than $16,000. I take it for granted that an industrial college, which is to give scientific instruction and mental training to the agriculturists, horticulturists, mineralogists and mechanics of the future great State of Missouri, must have a more extended corps of professors, and more varied and expensive appliances than a public high school. To meet the end proposed, it, to a certain extent, must be a polytechnic school in science and a normal school in the practical application of the sciences taught. It first teaches the facts, then the laws that govern in physics and produce these facts. Next, how to conduct operations so as to be a co-worker with these laws. It must have an experimental farm for illustration and practice; an orchard or a vineyard, to show how to prune for wood and how for fruit, and a model pruned tree or vine for samples. And so of the rest of the branches taught. A college, to do any good, must be of this character, and if anyone can show that the funds are ample for more than one such, let him do it, and we will go as far as the means to conduct them will justify. The educational history of the Union proves that colleges have been only beneficial when established with ample means, on a liberal basis. Many of the States have a college in each Congressional district, yet the citizens are compelled to send their sons abroad to be educated in the more liberally endowed colleges of other States; whereas, if a half-dozen of their home colleges were fused into one, they could be as liberally educated at home.

Whence come the students of Yale and Harvard, but from States that have five colleges where they need but one; and the combined endowments of all would be insufficient to maintain one of a respectable grade. There is really no argument of any force in favor of a division of our agricultural fund. The plausible one that the colleges will be better attended if the State be divided into districts, and one established in each, is not tenable. First, because the fund is too small to establish such district colleges or academies upon any basis adequate to be of any utility. Second, because of the fact above stated, that the more colleges a State has the poorer are its educational facilities for a thorough scientific training, and the more its citizens are incommoded, and hence compelled to patronize the more liberally endowed institutions of other States. The farmer or mechanic who desires to give his son an industrial education, cannot gratify this desire without incurring expense. He has, in addition, to lose the time and labor of his son; but he makes this sacrifice cheerfully, because, in the end, he believes he and his child will be more than compensated by the scientific education and training received. Now this expense will be incurred and time and labor lost, whether the son attends a poor or a good college; but in the resulting benefits there is an immeasurable difference. The question for him to decide is not whether the college is near or remote, but what its character. The nearer the college is the better, provided it offers all the facilities desirable; but distance is no obstacle if it does not. What the father desires is a thorough scientific training in and a profound comprehensive knowledge of the industrial pursuit his son may select. If we want industrial colleges patronized, we must lay their foundations broad and deep, so as fully to supply the educational wants of the classes they are intended to benefit. There was a time when education was not appreciated as now, and when even very little of it sufficed to constitute a person one of "the learned professions." Then it was supposed that agriculture, mechanism, and all the industrial pursuits had more relation to muscle than mind. Then, too, muscle was the motive power that moved the whole. The intense strain of muscle then overtaxed the laborer, and drove many, especially from the agricultural class, into less laborious pursuits. Since the invention of the mower and the reaper, the sulky cultivator and the innumerable kinds of labor-saving machinery, farming is an occupation of more ease, comfort and leisure. The farmer sees what art and science have done for him, and divines that their beneficent power towards him are not yet exhausted; a desire for knowledge is awakened in him; he feels the necessity of a professional library, and having more leisure than formerly, he reads and reflects more. He finds that there is a reason for everything under the sun; that nature carries on her operations by universal laws through her omnipresent agents; that his own operations are merely to produce favorable conditions for these laws and agents to operate without hindrance, and effect their normal results. It is to meet this awakening of the hitherto dormant intellectual faculties that agricultural colleges have become a necessity. The common school, or even academy, both very good in themselves, furnish no thread for unraveling the mazes of the labrynth in which the awakened intellect shows him he is placed. The practical apothegm,

> "A little learning is a dangerous thing;
> Drink deep or taste not of the Pierian spring,"

—Will be found to hold good in agriculture and mechanism, as in morals, religion and science. A little learning in morals and religion makes men infidels or bigots; in science, dogmatists; in everything impracticable, one-sided, unbalanced enthusiasts, or self-conceited apathists. Therefore, if we open fountains of knowledge, we want them to flow pure, and fresh, and deep, so that those who drink may never thirst again, but become themselves fountains of living water. Some scores of years since an ingenious mechanic invented a pocket knife, that was not only a knife, but a saw, a rasp, a file, a corkscrew, a screw-driver, a gimlet and a chisel. The invention would have been a success if each of these additional implements could have been used for any practical purpose. From necessity they were so small as to be of no practical utility, yet in the aggregate so large as to be an incumbrance. So it will be with these district agricultural colleges. The amount of knowledge they will impart in each of the branches will be so infinitesmally small as to be of no practical utility, yet in the aggregate large enough to weigh down and repress common sense.

Agriculture, in its true sense, is the sum total of many sciences. Of it can be truly said what Don Quixote said of knight-errantry: "Es una ciencia que encierra en si todas o'-las mas ciencias del mundo."* (It is a science that includes in itself all, or nearly all, the sciences of the world.) The farm is a laboratory in which the most complete chemical combinations are continually taking place. There is the soil containing many elements called salts; there are the gases, hydrogen, nitrogen and oxygen, forming or dissolving combinations; there are the acids, with their ever shift-

*Don Quixote, Part II, Cap. XVIII.

ing bases; there are the seeds infolding that mysterious principle called life, composed of many substances—some of starch, some of fats or oils, and all having albumen, gluten and other compounds; there is the atmosphere, composed of the breath of life, and above all, there is the great vivifier of the universe, from whom emanates not only all chemical motion, but all other motions besides. And there, too, are heat, light and electricity, subtile and ever acting agents. These all act harmoniously in producing combinations, out of which is evolved that strange phenomenon we call vegetable life. Each of these agents wants favorable conditions to act freely in the performance of its mission. The science of agriculture is a knowledge of what these conditions are, and the art of producing them. Other agents, such as frost, rain and snow, each are at work and performs its appointed task in the economy of nature. The utmost resources of natural philosophy and chemistry are taxed to furnish the knowledge which the agriculturist has need of. But in their present state of development, they furnish him, rather, hints for experimenting than positive knowledge for action.

Physiology, animal and vegetal, botany, anatomy, comparative anatomy, hygiene, in fact, all the laws that govern vegetal and animal life, are essential to a scientific understanding of the art of husbandry, for it lays them all under contribution. Meteorology, electricity, geology, mineralogy, the laws of nature and the laws of mechanism, together with all, or most all, the arts and sciences, bear each their tribute to this first and greatest of human pursuits. "It," and not knight-errantry, as Don Quixote says, "is a science that includes in itself all, or nearly all, the sciences of the world."

It cannot be denied that there are successful farmers who are not educated, nor scientific men in any sense of the term; but so there are successful lawyers and doctors and preachers who are in the same category. In all professions there is a certain routine, and he who has learned well, either by precept or experience, and practices this professional routine, is successful in the general acceptation of the term. These men would feel themselves insulted if charged with ignorance; yet it is, nevertheless, true, notwithstanding their success, that they know not even the alphabet of their respective professions. The law maxim, "he knoweth not the law who knoweth not the reason thereof," is applicable to all professions and pursuits. And the one who comes not thus equipped, is a charlatan, notwithstanding the success on which he bases his high pretensions. Success may be an evidence of business tact and of natural endowments, but it is no evidence of the inutility of high mental culture or professional training. In fact, the men of mark do not so regard it themselves. Talk to them, and they will lament their want of scientific culture. They will tell you that when they commenced their professional career, they were ignorant of its first principles, and that what they know they had to learn by dear bought experience. Experience has furnished them facts out of which they have formed professional theories by which they unlock the mysteries of their art; but then even these theories do not stand them in stead of positive knowledge.

Many years ago there was an occulist in London, celebrated not more for his success in treatment than for the skill and dexterity of his surgical operations. The royal college of physicians, astonished at the rapidity and skill of his operations, asked him how he came by such extraordinay attainments. By experiment and practice, he replied; but I spoiled a peck of eyes before I cured one. If the failures of those men who, by the force of natural endowments or inherent character, have worked up their way to position and fame, were known, perhaps their record, though not as revolting, would be equally as calamitous as that of the occulist. Men acting without a knowledge of the principles of their profession, may often be successful, and if so, the world makes a note of it, but makes no record of their failures. Whoever attempts to follow a profession or pursuit of which he has no definite idea, nor of the principles upon which it is based, attempts to solve a problem of whose elements he is ignorant; he gropes on blindly and falteringly, because doubt and uncertainty attend his steps. Often he is overwhelmed and lost in his devious path, because he is ignorant of the laws of nature, and of the causes operating around him. Character, fortune, the welfare and happiness of those who have confided in him or been entrusted to his care, are all wrecked by his inaptitude and ignorance. No one pretends that special education would secure success in all cases, and entirely prevent mishaps; but it would increase the number of cases of the former, and diminish those of the latter. So convinced are mankind of this fact, that from every profession and pursuit, whether on the farm, in the workshop, the forum or the pulpit, there alike ascends the prayer of the Grecian here:

> "Dispel this cloud, the light of heaven restore;
> Give me to *see*, and Ajax asks no more."

Men of scientific attainments see with regret how little the bar and the pulpit now-a-days draw their inspiration from nature, or enforce their arguments by illustrations and comparisons drawn

from the sciences. Indeed, their ideas are fossil exhumed from an anterior world, which may have had their use and been well adapted to their day and generation, but are now dead and without any life-giving power. This is the main cause that has lessened the power and influence of both, and created the alarm that the world is drifting on to a blank atheism. The fault is in their education. They have been taught words, not things—living, moving, energising things. Their business has been, as Cooper expresses it,

"To grind the divinity of other days,
Down into modern use."

—Instead of taking the torch of science, and illuminating, by its immortal light, the path of the erring and wandering, and leading them back to the fountain of all truth. Establish industrial colleges for the scientific education of the toiling masses, and they will reform the colleges and universities for the education of the learned professions, by driving out old fossilism, and substituting in its stead living, vitalizing principles, that have sympathy with toiling, suffering humanity. The thorough education of the industrial classes will necessitate a more thorough and scientific education of the professional ones; and the combined result will be a higher standard, intellectual, moral and religious, of both.

We have already quoted Don Quixote to show the scientific standpoint from which we ought to regard agriculture: There is so much felicity in his expression of the moral adornments that a knight-errant ought to possess, that we cannot refrain from quoting it, and applying it to the tiller of the soil. "He who professes it must be adorned with all the virtues, theological and cardinal; * * * * * he must preserve his fealty to God; he must be chaste in thought, decent in speech, liberal and generous in action, valiant in exploits, patient in toil, charitable to the needy, and finally, an asserter of truth, even though the defense of it should cost him his life."* By the education of the industrial classes, we intend to elevate them to that intellectual standard that they, being as they always must, "the many," will be able to take public affairs into their own hands, and shape the measures of government, both State and National, to suit their interest and welfare. Heretofore, even in legislative bodies, where they had the numerical majority, their inaptitude has made them, in all measures, defer to the representatives of capital and the learned professions. Our theory of government is, that the humblest citizen can aspire to and attain the highest positions. Practically this must only remain theory until the humblest citizen is trained intellectually and scientifically, so as to lead respect and dignity to the highest stations. Generally speaking, the representative men of the industrial classes are not office-seekers, and God forbid that they ever should become so; but when they are qualified to take the reins of government into their own hands, they will not brook the tricks of juggling politicians, that now degrade legislation and the administration of the laws everywhere. They will be true to themselves, and take the direction of affairs into their own hands, and administer it not for class interest, but for the interest of humanity.

To perform this high mission, they must not only be elevated to a high intellectual, but also to a high moral standard. "They must," as crazy Don Quixote says, "possess all the theological and cardinal virtues." Money making is a ruling passion with the Americans. To attain it, many have adopted the Jesuitical maxim—"the end sanctifies the means." Politicians have long since transmitted this maxim into "everything is fair in politics;" and traffickers, for "politics," have substituted "trade," and all classes are catching the infection and becoming demoralized. If this flood of demoralization is ever stayed, it will be accomplished by the more elevated standard of morals, still lingering amongst the industrial classes, reinforced and invigorated by high moral and intellectual training.

It now remains only to sketch the outlines and describe the machinery by which this great work is to be accomplished. This we will do so as to accord with our own feelings and views, and leave it to those most intimately interested, to adopt or reject whatever they may deem proper.

By nature we are radical. To cure an evil we would have it cut up by the roots; and to establish

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*El que la profesa, ha de estar adornado de todas las virtudes teologales y cardinales; ha de saber nadar; ha de saber herrar un caballo; ha de guardar la fe a Dios; ha de ser casto en los pensamientos, honesto en las palabras, liberal en las obras, valiente en los hechos, sufrido en los trabajos, caritativo con los menesterosos, y finalmente mantenador de la verdad aunque le cuesta la vida el defenderla.—Don Quixote, part II, Cap. 18.

NOTE.—The quotation in the original shows that Don Quixote placed "ha de saber nadar, y ha de saber herrar un caballo," (knowing how to swim, and how to shoe a horse) among the theological and cardinal virtues. As he had knight-errantry "on the brain," we must make some allowance for his classification.

a good we would ground it in sound principles. Compromises are abominations, and beget monstrosities. There is no affinity between light and darkness, nor between good and evil. He who undertakes to produce a reconciliation between them will find his labor abortive. A half-and-half measure never yet has been productive of good. By the inexorable logic of nature, developed in events, right is shown always to remain right, and wrong, wrong. There is no such thing as fusing and blending the two together, and by such fusion to produce a harmonious development of the true, the good and the beautiful. Taking these principles as our guide in establishing our industrial college, we must see that we start right, and we always will be right, or if we get wrong, we can soon rectify our error. On the contrary, if we start wrong, we will always be wrong, and never can get right, unless we undo all we have done.

The great object to be accomplished by these colleges is no less than to give intellectual culture and scientific training to those who are to control and shape the destiny of our new-born nation. It was their hands that upheld it in the fiery ordeal through which it has just passed. They saved it from traitorous enemies assailing it from without, and they must save it from the equally dangerous enemies, the cormorants who are assailing it from within, by undermining the great principles upon which it rests. While these colleges are preparing the industrial classes to apply scientific principles to the machinery that performs the multifarious operations in our fields and workshops, making our industry fifty and one hundred fold more productive, let them at the same time imbue them with patriotic zeal and devotion to labor for the good of their country, and give them that intellectual enlightenment that will enable them to guide the machinery of Government so that the fruits of their labor will not be filched from them by designing schemers, who are ever reaping where they have not sown. To do this we must break loose from old fossilism, which has dominated too much in the past. The times are propitious for this. The fountains of the great deep have been broken up in our nation, and have engulphed the ideas and follies of the preceding age, which men called political wisdom, so deep that the resurrection trump awakening the dead will never reach them and restore them to life. We are now free to adopt our own policy, and our duty to God, our country, ourselves and posterity, demands that we should meet our responsibilities well and wisely. Labor, so long shackled and a degraded and despised menial, now has its nobility restored; and we must see to it that it is never again called into question. The Almighty for it "planted a garden to the eastward in Eden" for "to dress and keep it," and to the tiller thereof "he gave dominion over the fish of the sea, and over the fowls of the air, and over the cattle, and over all the earth, and over every creeping thing that creepeth upon the earth." Let the workers now prove themselves worthy of this trust, and fulfil their high mission. Industry must henceforth become a commendation, and idleness a reproach.

Let us now proceed to sketch our programme. First, then, we strenuously oppose the junction of the industrial college with any of the so-called literary colleges. But while we do this, we conceive that there is a literary institution, designed for the industrial classes, which can be so conjoined to the advantage of both, and with resulting benefits far greater than can be attained by either of them acting separately. We mean the State Normal School, or Normal University, which the educational interests of the State now demands. Then it would be truly an industrial college, because it would bring within its reach and influence the education of both sexes. The young men, whilst qualifying themselves as teachers, would, at the same time, become practical agriculturists, horticulturists, &c. Following their profession of teaching in the winter, as many of them only would, they could give lectures upon the theory and practice of agriculture, etc.; and during the summer months, practical illustrations of the same. The benefits of the college would thus be carried into every neighborhood, and an interest in and zeal for agricultural progress and improvement awakened that cannot be attained by any other means. The young ladies, in like manner, learning the practical arts of housewifery, would exert an equally extended influence in after life. This new feature we should like to see incorporated in the Industrial University, which is entirely practicable, and certainly the most economical method for the State to establish a Normal University. Three or four hours will be given to labor each day. Whilst this gives skill in practice, lessening their expenses, it would do infinitely more: it would also give them healthy and vigorous constitutions.

The outline of instruction in the institution should be somewhat after the following schedule:

I. Chemistry, both pure and agricultural, chemical technology, practice in laboratory, qualitative and quantitative analysis.

II. Geology, metalurgy, mineralogy and mining.

III. Mathematics, civil engineering, bookkeeping, statics, dynamics, mechanics, physics, natural philosophy, meteorology and astronomy.

IV. Anatomy, comparative anatomy, physiology, veterinary, natural history, zoology, entomology, etc.

V. Languages, Latin, Greek, French and German, together with English literature.

VI. Domestic economy, bread-making, conserving fruits, making wine, cider, vinegar, syrup and sugar.

VII. Botany, practical horticulture and agriculture, including compounding manures and their application, classification and analysis of soils; mechanics in the use and application of agricultural machinery and implements.

VIII. A normal school, where the usual branches in such institutions are taught.

To impart instruction in the branches embraced in the above, and such others as may be found necessary to teach, the following aids will be necessary:

1. A farm large enough for the horticultural and agricultural purposes, for horses, cattle, sheep and hogs; with barn, pens, cribs, dairy, mill, driven either by steam or water power; turning lathe, sugar mill and evaporators, and infirmary for sick animals.

2. A kitchen, botanic and flower garden, vineyard, orchard and nursery.

3. A well-appointed chemical labratory, telescope, astronomical, mechanical and philosophical instruments and apparatuses, barometers, Fahrenheit's, Reaumer's and Centigrade thermometers, etc.

4. Geological, mineralogical, botanic, ornithological and entomological cabinets, embracing, amongst other things, every genus and species of each found in the State.

5. Reading-room and library, embracing all the valuable treaties on agriculture, horticulture, and such other subjects relating to the branches taught.

6. A collection of pathological preparations and objects.

The farm ought to be operated and carried on, as much as possible, by the pupils, both male and female; and the products of it used to sustain the general boarding house, so as to throw no expense upon the pupils, either for boarding or tuition, if possible.

The probable cost of such an institution would be:

For superintendent or president of college	$2,500
For president of normal school	2,400
For mathematical professor	2,000
For adjunct professor	1,500
For professor of chemistry	2,000
For adjunct do	1,500
For professor of natural history and philosophy	2,000
For adjunct do	1,500
For professor of languages, both ancient and modern	1,500
For instructor in music	1,200
For instructor in drawing	1,200
For instructor in military tactics and sword exercises	1,000
For head farmer and a house	900
For head gardener and a house	900
For head orchardist and vineyardist and a house	900
For expert farmer, to take charge of stock, and a house	500
For expert farmer, to take charge of agricultural implements, and a house	500
For porteress (which may be the wife of one of the professors or farmers)	300
For matron (which may be the wife of one of the professors or farmers)	300
For dairymaid (which may be the wife of one of the professors or farmers)	300
For chemicals, etc	1,200
Amount	$26,100
Deduct normal professor's salary, to be paid by the State	2,400
Total cost	$23,700
Six per cent. on the agricultural fund, as estimated	24,750
Surplus	$1,050

Another important feature of the university should be that of raising choice blooded stock, where our farmers could obtain what they desire at reasonable rates, and with confidence in its purity. This might be made a source of considerable revenue to the college, and reduce the expenses of the students. Many other considerations throng upon us, but this must suffice, and close the discussion for the present.

THE IMPORTANCE OF A SCIENTIFIC SURVEY.

At a meeting of the Board of Agriculture, on the 27th of December last, the subject of a geological or scientific survey was under consideration. Without adopting any definite resolutions on the subject, the Secretary was directed to present the subject to the consideration of the Legislature. Since the meeting referred to, a resolution has been offered in the Senate, authorizing an inquiry in regard to the unpublished results of the former geological survey.

The statement has appeared that the survey referred to has cost the State already ninety thousand dollars. This seems an astonishingly large amount, though it is not known, generally, how much work was done. So far as the public has been benefited by that survey, it should not have cost probably one-fourth that sum.

If there are now existing unpublished results of an important and available character, which may be obtained and published at a reasonable cost, no doubt can be entertained of the propriety of giving the State the benefit of it. But if it is likely to cost in proportion to the results already appreciable, it is a question whether it would not be better policy and better economy to let it remain in its present condition of oblivion or obscurity.

One fact it may be proper to mention in this connection: there has been very frequent inquiry, within the past seven or eight years, at least, for the printed copies of our geological survey, and not one could be obtained. This may be taken as evidence of the demand for such information, and the importance of it; and also of the bad economy of being too stingy in regard to the number of copies to be issued of a work of that character.

People of other States and other countries are anxious to obtain such information in regard to Missouri as a geological report should contain. Inquiries have been frequent at the office of the Board of Agriculture in St. Louis, during the past summer and fall, for copies of the geological report, or for competent geologists to make examinations, by parties who were desirous of making the most profitable investment in Missouri.

Aside from the immense value of spreading abroad information of the natural advantages and capacities of the State, it is the evident duty of the State authorities to obtain a knowledge of our resources, and to spread it among the people of the State.

A committee of the Board of Agriculture of the State of Maine, in a report on this subject, stated that the objects of the survey are to ascertain and bring to light, and thus to put in the way of development, all the natural resources of the State. And this, they very aptly stated to be, in fact, "taking an inventory of the goods and chattels which we possess, or, rather, like taking an account of stock of the raw material with which nature has endowed our domain, and stating the place of its deposit and the probable amount which can

be relied on for future use. That such knowledge is not only useful, but necessary to the proper conception of what our domain is, and what can be done in and of ourselves, and, consequently, what our prospective wealth and power may become, is self-evident. Every prudent man deems it necessary to do this in regard to his own private property. The Executive and the Legislature stand in the same capacity to the public domain as an individual proprietor does to his own possessions; and, by purity of reasoning, should take the same pains to ascertain what our resources are. That community is the wealthiest and the strongest which possesses the most of the natural resources of industrial material; provided, that while possessing them, they know of their existence, their nature, location and the facilities for bringing them into use, and thus for converting the raw material into actual wealth and power.

The plan adopted in Maine for organizing their scientific survey, and publishing the results, is rather peculiar, and seems to have been very economical. As far as can be judged by the published reports, the work was very thoroughly done, so far as it extended, and was of a very excellent character.

The Legislature of that State, in 1861, passed a series of resolutions, authorizing the Governor and Secretary of the Board of Agriculture to contract with some suitable person or persons to conduct a survey which should embrace the geology, agriculture, natural history and physical geography of the State. They were to analyze soils, minerals or other deposits whenever found, of a character demanding minute and careful investigation, into their characteristics and economical value, and to collect and prepare for deposit in the public buildings specimens illustrative of the geology, agriculture and natural history of the State.

The persons employed were to present a report of their proceedings and progress by the third Wednesday in January, each year, to be published with and incorporated in the report of the Secretary of the Board of Agriculture. To accomplish this work, there was appropriated out of the treasury the sum of three thousand dollars, to be expended under the direction of the Governor and Secretary of the Board of Agriculture.

It is not known whether this sum was ample or not, but it is known that the survey was prosecuted for several years, employing several competent men in the field for a period of about three months in the year. The reports containing the scientific survey, together with the agricultural report proper, are entitled "The Agriculture and Geology of Maine." The scientific portion is of a sufficiently popular character to be very interesting and valuable.

It is believed that a similar plan for Missouri is the most practicable that can at present be devised; and that an appropriation of five thousand dollars would be sufficient to commence the work, and perhaps that amount annually would continue it as long as desired.

There are often to be found very competent young men, who are anxious to pursue their studies and investigations in natural science, who wish to make for themselves a reputation, whose services can be obtained for a comparatively small compensation, and who would in many instances do more careful and thorough work than older men who have less important objects in view to stimulate them.

The necessity for instituting such a work in Missouri ought to be sufficiently apparent to every one. There are large portions of the State—the extreme Southeast, for example—of which literally nothing is known in print. There are other large portions, of which just sufficient is known to make them interesting fields for investigation, and of which more information is earnestly sought by individual enterprise. The State may lose largely in various ways for lack of such information. We have now the agricultural college lands to select, and more information should be possessed in regard to their character, in order that their value and importance may be known.

If a scientific survey can be at once inaugurated, even upon a small scale, according to the plans suggested, it is believed that the good results will be so apparent that there will be no future difficulty in regard to the necessary means to continue it. All the money which is judiciously expended in developing and making known the resources and natural wealth of the State will very soon be repaid, with interest an hundred fold.

Why not appropriate a small portion, say ten thousand dollars, of the proceeds of the sale of the State Tobacco Warehouse to this important object?

L. D. MORSE, *Corresponding Secretary.*

PROCEEDINGS

OF THE

STATE BOARD OF AGRICULTURE.

St. Louis, March 13, 1865.

Present—Dr. George R. Buckner, from St. Charles county; Hon. Gert. Gœbel, from Franklin county; Hon. Francis Kellermann, from Washington county; Hon. George Husmann, from Gasconade county; Hon. Frederick Muench, from Warren county; Dr. L. D. Morse and Mr. Henry T. Mudd, from St. Louis county, and Mr. Barnabas Smith, from Crawford county.

Absent—Mr. W. T. Essex, from St. Louis county, and Judge Chas. A. Newcomb, from Jefferson county.

The Board was called to order by Dr. Morse, and moved that the Hon. Frederick Muench be appointed President *pro tem.* of the Board, which was carried.

The President *pro tem.*, on taking the chair, stated that the object of the meeting was to organize the State Board of Agriculture, pursuant to act entitled "an act for the encouragement of agriculture," passed at the late session of the Legislature, and presumed the next step was to appoint a Secretary *pro tem.*

On motion, John H. Tice was appointed Secretary *pro tem.*

The President stated that the Board was now ready to proceed to business, and the first thing in order was to effect a permanent organization.

On motion, it was

Resolved, That the President appoint a committee on permanent organization, to consist of three members, whose duty it shall be to report permanent officers of the Board.

The President appointed Messrs. Buckner, Husmann and Kellermann to constitute said committee.

Mr. Kellermann called for the reading of the act under which the

Board was acting, in order that the Board might know its powers and duties.

No one having a copy of the recent act as passed, the President said it was the same act as passed December 1, 1863, entitled "an act for the encouragement of agriculture," except changing the names of the incorporators and the time for the meetings of the Board.

On motion, the Board then adjourned, to meet again at two o'clock, P. M.

AFTERNOON SESSION.

The Board met pursuant to adjournment.

Present, same as forenoon, and Mr. Essex, from St. Louis county.

Dr. Buckner, from Committee on Permanent Organization, reported for permanent officers: For President, Henry T. Mudd; for Vice President, George Husmann; for Secretary, L. D. Morse; and for Treasurer, Frederick Muench.

Dr. Buckner stated that these nominations were made from members of the Board, because there was a diversity of opinion whether the Board could go outside of its members for officers.

Report was received and committee discharged.

Mr. Mudd declined the nomination, and among other reasons assigned for declining, because the law required the President of this Board to act in certain important matters in conjunction with the President of the State Horticultural Society. Being President of the State Horticultural Society, made it incompatible, in his judgment, to combine the two offices in one person.

Dr. Buckner moved that Mr. Mudd's declination be accepted, which was lost.

Dr. Buckner then moved that the nomination of Mr. Mudd for President be unanimously confirmed, which was carried.

On motion, the nomination of George Husmann for Vice President was unanimously confirmed.

Dr. Morse declined the nomination for Secretary, stating that his official duties required all his time, and made it impossible to attend to the duties of Secretary, and offered the following resolution:

Resolved, That it is the opinion of this Board that it has the power, if it thinks it advisable, to choose a Secretary of the Board who is not a member of it and has no vote in it.

Which resolution, after mature consideration, was adopted.

On motion of Dr. Morse, the Board then proceeded to ballot for Secretary, which resulted in the election of John H. Tice.

On motion of Mr. Mudd, the nomination of Frederick Muench for Treasurer was unanimously confirmed. Mr. Muench then conducted Mr. Mudd, the President elect, to the chair.

Mr. Mudd, on taking the chair, returned his thanks to the members of the Board for the honor conferred on him, stating that it was well

known to the members that he had not sought it, did not desire it, and it was forced upon him against his protest. He believed the Board contained other members who were competent to discharge the duties, and do more for the success of the cause than he could. But his opinion being overruled by the action of the Board, he had to acquiesce, and assumed the duties and responsibilities of the station, with the determination to do, according to his abilities, the best he could.

The President then stated that the first business in order was to classify the members according to their term of service, according to the requirements of the law.

On motion of Dr. Morse, it was resolved that ten billets of paper, corresponding to the number of members of the Board, be prepared and numbered from one to ten inclusive, and that, in drawing, any member who has drawn an even number shall be entitled to the long term, and those members drawing odd numbers shall be entitled to the short term of service.

The drawing resulted as follows:

For the long term: Messrs. Buckner, Essex, Morse and Smith.

For the short term: Messrs. Gœbel, Husmann, Mudd, Muench and Kellermann.

The undrawn ballot being No. 10, Judge Newcomb was declared to belong to the long term class of members.

Dr. Morse submitted a blank form prepared by William C. Flagg, of Illinois, for gathering agricultural and horticultural statistics, by sections.

On motion of Dr. Buckner, it was

Resolved, That a committee of three members be appointed by the President to prepare a blank form for gathering agricultural and horticultural statistics.

The President appointed Messrs. Buckner, Kellermann and Smith to constitute said committee.

On motion of Dr. Buckner, Dr. Morse was added to said committee.

On motion of Mr. Kellermann, it was

Resolved, That the Secretary and Dr. Buckner prepare a constitution and by-laws for the organization of county agricultural associations throughout the State.

Dr. Morse offered the following resolution, which was adopted:

Resolved, That a committee of three be appointed by the President, whose duty it shall be to prepare by-laws for the government of this Board, also to inquire into and define the rights and privileges of *ex-officio* members, and report at the adjourned meeting of this Board.

Messrs. Morse, Gœbel and Husmann were appointed said committee.

Dr. Morse offered a resolution to have questions prepared so as to elicit statistical information, which was referred to the Committee on Forms for Agricultural and Horticultural Statistics.

Mr. Muench submitted a resolution to have a special session of the

Board in Jefferson City, during the first week of the adjourned session of the Legislature.

Mr. Gœbel submitted an amendment to substitute Hermann for Jefferson City, and the time the second day of the Hermann county fair, in September next.

Mr. Kellermann moved to indefinitely postpone the resolution and amendment, which was lost.

The amendment of Mr. Gœbel was then carried, and resolution as amended adopted.

On motion of Mr. Kellermann, it was

Resolved, That the Secretary inform the agricultural department at Washington of the organziation of the State Board of Agriculture of Missouri, and solicit such plants, seeds, etc., as the department may have for distribution.

Dr. Morse submitted the following resolution, which was adopted:

Resolved, That the President appoint a committee of three, to report upon the best measures to establish a permanent agricultural fund and drafting a bill for that purpose, to be submitted to the Legislature at the adjourned session.

Messrs. Morse, Buckner and Essex were appointed said committee.

Dr. Morse read from the act that section which requires the Board to report to the Legislature; defines what is to be reported, "and to give a general view of the condition of agriculture throughout the State, accompanied by such recommendations—including especially agricultural education—as they may deem interesting and useful;" and concluded by submitting the following preamble and resolution:

WHEREAS, The mechanic arts and agriculture are so nearly related in practice, and so mutually dependent, that the best interests of those engaged in both those pursuits demand, so far as possible, the education of pupils designed for these pursuits to be conducted in association with each other; and

WHEREAS, The practice of agricultural associations, whether the term "mechanical" has or has not been attached to their title, has ever been to encourage in an equal degree the mechanical arts with arts more purely agricultural, by the payment of premiums and otherwise; and

WHEREAS, The expression of opinion by every public convention and every organized body which has discussed and considered this subject for the past twenty years, in the various States of the Union, has been uniformly and strongly in favor of preserving an intimate association and entire unity in the educational training of the pupils referred to; therefore,

Resolved, That we hereby indorse and adopt the opinions and principles referred to, and insist that, to divide the endowment fund granted by Congress and appropriate it to two or more institutions, which shall provide but in part the departments and course of study contemplated by the act of Congress, approved July 2, 1862, will be

not only a palpable perversion of that grant, and in direct violation of its clear and explicit terms, but will defeat and destroy the crowning excellence of an industrial university worthy of the State and the nation.

Resolved, That we hereby, in the most deliberate and positive manner, recommend and urge the honorable Senate of Missouri to pass and adopt the bill to establish "The Misrouri Agricultural and Mechanical College," substantially as passed by the House of Representatives.

The subject was discussed by Messrs. Muench, Morse, Kellermann, Husmann, Mudd and Smith.

The only diversity of opinion was in relation to a mining school. Mr. Muench, in his remarks, said he wished not to be understood as depreciating a mining school; he had no question of the utility, and even necessity, of such a school. But to have one worthy of the name, would cost more than Missouri can afford to give. One good mining school would do for the whole United States, and such a one ought to be established by Congress.

On motion of Mr. Smith, the preamble and resolutions were referred to a special committee of three, to report at the next adjourned meeting.

The President appointed Messrs. Smith, Kellermann and Morse said committee.

On motion of Dr. Buckner, the Board adjourned to meet again at seven o'clock, P. M.

EVENING SESSION.

The Board met.

Present—Messrs. Buckner, Kellermann, Husmann, Morse, Muench, Newcomb, Smith, Mudd and President.

Absent—Messrs. Essex and Gœbel.

The subject of establishing county agricultural societies was taken up and considered.

On motion of Mr. Kellermann, it was

Resolved, That Judge Newcomb be requested to write an appropriate address to the people of the State, urging them to form county agricultural associations in every county of the State, and report the same to this Board at its adjourned session.

On motion of Dr. Buckner, it was

Resolved, That when this Board adjourn, it adjourn to meet again at ten o'clock, A. M., on Tuesday, the 28th inst., at St. Louis.

On motion, the Board then adjourned accordingly.

JOHN H. TICE, *Secretary*.

St. Louis, March 28, 1865.

The Board met pursuant to adjournment.

Present—Dr. George R. Buckner, of St. Charles county; Wm. T. Essex, of St. Louis county; Hon. Francis Kellermann, from Washington county; Dr. L. D. Morse, from St. Louis county; Hon. Frederick Muench, from Warren county; Judge Newcomb, from Jefferson county; Barnabas Smith, from Crawford county, and Henry T. Mudd, President, from St. Louis county.

Absent—Hon. Gert. Gœbel, from Franklin county, and Hon. George Husmann, from Gasconade county.

Dr. Morse, from Committee on By-Laws, reported a code of by-laws containing twelve sections.

On motion of Mr. Kellermann, the report was received and committee discharged.

On motion of Mr. Kellermann, the report was taken up, and acted upon by sections.

Section one was read and adopted.

Section two being read, and, on motion of Mr. Kellermann, amended, by striking out the word "orders," and inserting in lieu thereof the word "warrants," and inserting the words "ordered by the Board," after Treasurer. The section, as amended, was then adopted.

Section three was read, and, after amending by striking out "orders" and inserting "warrants," adopted.

Section four being read, Mr. Kellermann moved that the clause relating to the disbursements by the Treasurer shall read, "and pay all warrants drawn on him by order of the Board, signed by the President and countersigned by the Secretary," after which the section, as amended, was adopted.

Sections five and six were read and adopted.

Section seven adopted, after inserting "Recording" before Secretary.

Section eight being read, on motion of Mr. Smith, was amended, by striking out the word "traveling," before the word "expenses;" the section, as amended, was then adopted.

Section nine, as follows, was then read:

"SEC. 9. The *ex-officio* members of the Board shall be considered entitled to full membership, to all intents and purposes, at and during the annual meetings; and shall have the right to participate in all other meetings of the Board; but in no case except at the annual meetings, shall the vote of *ex-officio* members overrule a majority of the incorporate members."

Dr. Morse stated it was not clear to his mind that the Board had a right to adopt this section. He had reported it because the committee were instructed to define the "rights of *ex-officio* members."

Mr. Mudd having called Judge Newcomb to the chair, opposed the section, because the law creating them *ex-officio* members must be construed like all other laws in similar cases; whatever rights and

privileges they had were conferred upon them by law, and this Board could not curtail or abridge those rights.

Mr. Muench concurred in the view taken by Mr. Mudd. It may be necessary hereafter for the harmonious and efficient action of the Board to restrict the privileges of the *ex-officio* members; but that could only be done by legislative action. Until experience demonstrated this necessity, he was for letting the law remain as it now stands.

On motion of Dr. Buckner, the section was rejected.

Sections ten and eleven were read and adopted.

The twelfth section was read, and, on motion of Mr. Kellermann, amended, by adding the following proviso: Provided, that any member proposing to amend the by-laws at any meeting of the Board, shall give two weeks' notice prior to said meeting, to all the incorporate members or their successors in office of such intended motion to amend.

The section, as amended, was then adopted.

[The by-laws, as amended and adopted, are printed on page 8.]

On motion, the Board then adjourned to meet again at 2 o'clock, P. M.

AFTERNOON SESSION.

The Board met. Present, all members of the Board.

Hon. Frederick Muench asked leave of absence to attend a meeting of the Board of Immigration; which was granted.

Dr. Buckner, from the Committee on Constitution and By-Laws of County Agricultural Societies, reported a constitution and by-laws for same.

On motion, the report was received and the committee discharged.

Dr. Morse stated that it was necessary in these county agricultural societies, to conform to the regulations for them as prescribed by law. That while the constitution submitted by the committee possessed many merits which he would like to see incorporated in the constitution to be adopted, yet it was defective in this: many of the rules prescribed for their government by the act of 1855, were not provided for by any article in the proposed constitution and by-laws. He therefore submitted a substitute constitution for that proposed by the committee.

On motion, the report of the committee and substitute were referred to the Committee of the Whole. The Board then resolved itself into the Committee of the Whole, Mr. Husmann in the chair.

After spending some time in Committee of the Whole, the committee rose, and Mr. Husmann made the following report:

MR. PRESIDENT: The Committee of the Whole, having had under consideration the subject of a constitution for the formation and govern-

ment of county agricultural societies, have instructed me to report the following constitution, and recommend its adoption.*

Which being read, on motion of Dr. Morse, was adopted by the Board.

Dr. Buckner, from the Committee on Forms and Statistics, reported a form for collecting agricultural and horticultural statistics; which was adopted.

On motion of Dr. Morse, it was

Resolved, That a copy of the form adopted for collecting agricultural and horticultural statistics be forwarded to the Secretary of State, with a request to have blanks of the same printed and forwarded to the various counties for the purpose contemplated by the form.

Dr. Morse, from the Committee on Agricultural Fund, reported progress, and asked further time to mature a bill for the action of the Legislature at its adjourned session.

On motion of Mr. Husmann, time was given to the committee till the September meeting of the Board to make report.

Dr. Buckner said since the adoption of Dr. Morse's resolution for printing the form for statistics and distributing the same, he had reflected over the matter, and came to the conclusion that it was premature to do so at present, especially in the present condition of things in Missouri. The Board and the public would probably not gain anything by it, and it would involve considerable expense. He therefore moved a reconsideration of the vote adopting the said motion.

Mr. President stated that the printing of the form embraced a large amount of ruled work, which is very costly, and might at this early stage of the Board's existence create an unfavorable impression against it. This, together with the questionable utility of the measure in the present disorganized condition of things, inclined him to defer the measure at present. The vote adopting the resolution was then reconsidered, and the resolution rejected.

Judge Newcomb then read an address prepared by him, according to request, to the people of Missouri, urging them to form county agricultural societies.

On motion of Mr. Husmann, the address was received and ordered to be printed with the proceedings of the Board.

Dr. Morse, from the Committee on Forms and Statistics, reported a general letter to be printed and forwarded to proper persons in each county, asking answers to the questions annexed to said letter.

Which, on motion of Mr. Kellermann, was received, and, on motion of Mr. Kellermann, referred to the members of this Board who are members of the Board of Immigration, to consult with the latter Board and revise the questions so as not to embrace any matter that may

*The form of constitution recommended is inserted at the end of the proceedings of the Board for the purpose of adding some comments.—*Corresponding Secretary.*

be fully answered in questions to be propounded by the Board of Immigration.

On motion, the Board then adjourned to meet again on to-morrow morning at 10 o'clock.

WEDNESDAY, March 29, 1865.

The Board met.

Present—Messrs. Buckner, Gœbel, Kellermann, Morse, Smith and Mudd, President.

Absent—Messrs. Essex, Husmann, Muench and Newcomb.

Mr. Kellermann, from the committee to consult with the Board of Immigration, reported back the questions referred to them, revised as instructed, which were read and adopted.

On motion of Mr. Kellermann, the President was instructed to have five hundred copies of the letter and questions printed, to be distributed to proper persons in each county of the State.

On motion of Mr. Kellermann, the President was instructed to apply to the proper authorities for the funds appropriated by law for the use of this Board.

On motion of Mr. Kellermann, it was

Resolved, That the President be directed to cause to be published, in pamphlet form, by the State Printer, the proceedings of this Board, with the by-laws adopted, the constitution recommended for adoption to county societies, with the address to the agriculturists of the State, together with the transactions of the State Horticultural Society at its late annual meeting, as provided for in section nine of "an act for the encouragement of agriculture," approved December 1, 1863.

On motion of Dr. Morse, it was

Resolved, That a committee of three be appointed to report at the next meeting of the Board upon the qualification necessary for, and the character of report that should be required of the commissioners who may be appointed to locate the college lands donated to the State by Congress.

Dr. Morse stated that he was under the impression that the Legislature, at its recent session, had passed an act for the appointment of commissioners to locate the Industrial College lands, but in corresponding with the Governor in relation thereto, regretted to find such was not the fact, as would appear by the following letter received from the Governor:

EXECUTIVE DEPARTMENT,
CITY OF JEFFERSON, March 23, 1865.

SIR: Yours of the 21st is at hand. In reply I regret to state that

such an act as you mention was not passed by the recent session of the Legislature. I endeavored to have such an act passed, but failed in accomplishing my desire.

I am, respectfully, your obedient servant,

THOS. C. FLETCHER.

To L. D. MORSE, ESQ.

The President appointed Messrs. Morse, Gœbel and Smith said committee.

Mr. Smith inquired of the President whether the St. Louis Agricultural and Mechanical Association contemplated holding a fair the coming autumn.

The President stated he had not heard of any such a design, and presumed there would be none.

Mr. Smith stated that, from the promise of an unusually abundant yield, both of orchards and vineyards, he thought it might advance the fruit growing interest to get up a fruit exhibition this fall.

On motion of Mr. Kellermann, it was

Resolved, That the Executive Committee be instructed to take the subject into consideration, and consult with the State Horticultural Society of this State and of the State of Illinois, on the propriety of holding such an exhibition.

The Board then proceeded to elect a Corresponding Secretary.

Mr. Smith nominated Dr. Morse.

Dr. Morse nominated Mr. Kellermann.

Mr. Kellermann declined, and moved that the nomination of Dr. Morse be confirmed by acclamation; which was carried.

On motion of Mr. Smith, it was

Resolved, That the President of this Board be instructed to confer with the presidents of the several railroads to grant a free pass over their roads to the members of this Board and its officers when in the discharge of their duties.

On motion, the Board then adjourned to meet again at Hermann, on the second day of the Gasconade county fair, in September next.

JOHN H. TICE, *Recording Secretary*.

HERMANN, September, 1865.

There being no quorum present, the Board adjourned, subject to call of President.

JOHN H. TICE, *Recording Secretary*.

JEFFERSON CITY, November 13, 1865.

The Board met pursuant to a special call of the President.

There were present—Wm. T. Essex, of St. Louis county; Hon. Gert. Gœbel, of Franklin county; Hon. Francis Kellermann, of Washington county; Dr. L. D. Morse, of St. Louis county; Henry T. Mudd, of St. Louis county, and Hon. Frederick Muench, of Warren county.

Absent—Dr. George R. Buckner, of St. Charles county; George Husmann, of Gasconade county; Hon. C. A. Newcomb, of Jefferson county, and Barnabas Smith, of Crawford county.

The minutes of the last meeting were read and approved.

The President, Mr. Mudd, stated that he had not deemed it advisable to have the proceedings of the Board printed in form of an annual report, because they were too meager, and also, because papers to be prepared and published with them had not been handed in until a late day.

The President also stated that he had not applied for the amount appropriated by law, as required by resolution, but would do so before the close of the present session of the Board.

The President also further stated that, pursuant to instructions, he had applied to the different railroad companies for a free pass over their respective roads, to the members and officers of the Board, while in the discharge of their duties; that the North Missouri and Iron Mountain roads had promptly responded to the same, by issuing the papers applied for; that the Pacific Railroad had made no response, but upon personal application, had granted a pass for the present occasion.

Hon. Senator Muench read a bill, for information of the Board, drawn up by him, amendatory of the act creating this Board, and making an additional appropriation.

Dr. Morse regarded an additional appropriation as very essential to the usefulness and success of the Board. The Board ought to have rooms in the city of St. Louis, as a kind of agricultural and horticultural headquarters, where the different agricultural and other papers can be filed for use of persons visiting the city interested in agricultural and horticultural pursuits; where the products of the State could be exhibited, a mineralogical cabinet collected, and the library, consisting of agricultural publications and the annual reports of other States, could be established. He stated that he had been very liberally furnished by many States with their annual reports for a series of years, and many more had promised to send theirs. This involved not only expense in paying the express charges, but of fitting up a place for their safe keeping. There were also many other ways of promoting the agricultural interest of the State, which had to be omitted because of the expense involved.

Dr. Morse submitted the following resolution:

Resolved, That, in the opinion of the Missouri State Board of Agri-

culture, the important interests of sheep husbandry demand of the Legislature the enactment of a law which shall impose a tax on all the dogs in the State, sufficiently large and of such a character as to afford adequate protection; and that the imposition of this tax should not be left to the discretion of the several counties, but should be imperative.

Mr. Gœbel conceded the necessity of enacting a law that will restrict the number of dogs, if sheep raising is to become a leading interest in the State. Our soil and climate are most admirably adapted to this remunerative branch of husbandry, and hence it must become one of the leading pursuits of our people. But he had some doubts of passing at this time an imperative dog law, and believed it would be difficult, if not impossible, to enforce the same.

Dr. Morse said he was aware of the feelings of the people in some portions of the State respecting a dog law, but since he had been in the capital he had conversed with many of the residents in portions of the State where this feeling exists, who, considering the necessity of such a law, had expressed a willingness to pay a tax on a good dog. Other States, after many failures, had at last succeeded in having an efficient dog law passed, and were now reaping the benefits of it.

The resolution was then passed.

Mr. Gœbel said, as the Board had passed a resolution for the protection of the sheep fold, he hoped it would pass one for the protection of orchards, vineyards and gardens. His constituents, the people of Franklin county, were suffering much from the depredations of fruit stealers, and desired that a law should be passed making the stealing of fruit felony. There was a time when his constituents had no access to market, and when common fruit of inferior quality only was cultivated. Then fruit had but little intrinsic value, and the taking of fruit was not considered as a depredation. But with the opening of access to market, the people found it a profitable investment, and had bought and planted orchards of the choicest fruits. In the meantime, the number of depredators had increased in a tenfold ratio, and now the losses sustained by the people from this unlawful practice were serious, and called for a remedy. He, therefore, hoped the Board would take some action in the matter, and call the attention of the Legislature to the subject, to devise a remedy.

Dr. Morse and the President fully indorsed these views, and considered that the evil, especially near large towns and cities, and along the railroads, demanded an effective remedy.

Mr. Kellermann stated that Judge Newcomb, a member of this Board, and a Representative in the Legislature from Jefferson county, was drafting a bill embracing this and other misdemeanors to orchards, gardens and vineyards, and that all fines imposed under the provisions of the bill should be appropriated to the agricultural fund.

Mr. Kellermann then offered the following resolution, which was adopted:

Resolved, by the State Board of Agriculture, That Judge Newcomb be requested to draft a bill for the protection of orchards, vineyards and gardens, and submit it for action to the General Assembly now in session.

Senator Muench presented a translation into English of his Manual on the Culture of the Vine; which, on motion of Mr. Essex, was referred to a committee of three to report thereon.

The President appointed Messrs. Essex, Morse and Smith said committee.

The Board then adjourned, to meet again at three o'clock P. M. on to-morrow.

JOHN H. TICE, *Recording Secretary.*

TUESDAY, November 14, 1865.

The Board met pursuant to adjournment.

Present, same as yesterday, except Mr. Kellermann. Mr. B. Smith, of Crawford county, also was present.

The President reported that he had received one hundred dollars, being the amount appropriated by law for the expenses of this Board.

On motion of Mr. Essex, the Recording Secretary was instructed to procure a corporate seal, with appropriate device, for the use of this Board.

A communication from the State Auditor was received and read, in reference to obtaining agricultural statistics by the assessors and census takers, and also in reference to establishing a bureau of statistics.

Dr. Morse read the draft of a bill proposed to be laid before the Legislature, embracing the entire range of agricultural, horticultural and other statistics, which was approved by the Board.

The Board then adjourned, to meet again at the annual meeting in December, in the city of St. Louis.

JOHN H. TICE, *Recording Secretary.*

ST. LOUIS, December 6, 1865.

This being the stated annual meeting of the Board prescribed by the act of incorporation, there were present, Messrs. William T. Essex, of St. Louis county; Hon. George Husmann, of Gasconade county; L. D. Morse, of St. Louis county, and Henry T. Mudd, of St. Louis county, of the incorporated members; and N. J. Colman, President of the St. Louis Horticultural Society, and Hon. J. W. Harris, delegate

from the Boone County Agricultural and Mechanical Association, *ex-officio* members.

Absent—Hon. Gert. Gœbel, of Franklin county; Dr. George Buckner, of St. Charles county; Hon. Francis Kellermann, of Washington county; Hon. Frederick Muench, of Warren county; Hon. Charles A. Newcomb, of Jefferson county, and Hon. B. Smith, of Crawford county, of the incorporated members.

The President, Mr. Mudd, then read the following address:

ADDRESS OF THE PRESIDENT.

Gentlemen of the State Board of Agriculture:

We have assembled for our first annual meeting, in pursuance of a law of the State for the encouragement of agriculture, and particularly to discharge the duties imposed upon us by the fifth section of the act incorporating the Missouri State Board of Agriculture.

I would be allowed briefly to refer to the history of our present organization. At the regular monthly meeting of the Meramec Horticultural Society, (which, by the way, is the oldest horticultural society in the State,) held at Allenton, St. Louis county, on the second day of August, 1860, the following preamble and resolution, offered by Dr. L. D. Morse, was unanimously adopted:

WHEREAS, The policy of aiding and encouraging agricultural progress and improvement, by means of State appropriations, and the establishment of State boards of agriculture, has been adopted in most of the States of the Union—in many tested for a score of years—and has been found, without exception, to be in the highest degree judicious and profitable; therefore,

Resolved, That a committee of three members of this Society be appointed to prepare a circular, calling attention to the importance of taking steps for the formation, at an early date, of a State board of agriculture, and for urging the passage of an act by the next Legislature for the advancement of agriculture; and to send a copy to every agricultural and horticultural society, and every newspaper in the State, requesting such action and coöperation as the importance of the subject demands.

Under this resolution a committee was appointed, consisting of Dr. L. D. Morse, Dr. A. W. McPherson and T. R. Allen, Esq.

This committee, at a subsequent meeting of the Society, held on the 16th of August, 1860, reported as follows:

"The committee, appointed as above, deem the fact set forth in the preamble so patent and forcible as to render it unnecessary to add much by way of calling attention to the importance of immediate action in the matter. Public men are ever ready to admit that agriculture is the basis of our prosperity—that it is intimately connected with the prosperity of all other branches of business. They are ever ready

to bestow idle praise upon honest productive industry; but something more than empty commendation is needed. It is the duty of society to encourage and promote the discoveries and developments of science, as connected with rural pursuits, and to spread the results thus attained among the mass of practical farmers. Science is but another name for knowledge.

"It is a stubborn fact that our cultivated lands, generally, are deteriorating in productiveness. It is doubtless a fact that the same amount of labor now employed in agriculture, would produce one-third more were it judiciously employed. It is mainly because the intellect employed in such pursuits is less developed, or less educated for the purpose, than the mind devoted to professional or other occupations, that agricultural labor is so poorly rewarded. Hence, the judiciousness cannot be doubted of a State expenditure for the instruction of the producing classes, in regard to the best manner of applying their means and honest toil, and of keeping and enjoying the proceeds. Such expenditure would soon be more than amply repaid by the increased prosperity of the State, and a large proportion of our growing taxes for the support of the poor and the punishment of crime would cease forever.

"Many of our sister States have accomplished much for agricultural improvement through their State boards of agriculture. Several of them have, and others are about establishing agricultural colleges and experimental farms for the better education of the rural classes. Such facts accuse us of being behind the age. The natural advantages of our State are eminently superior. It is clearly our duty, as good citizens, not only to see that our rich domain is not squandered by improvident tillage, but also to put forth our best exertions for the ample development of all our resources, and particularly for the improvement of that branch of industry in which the mass of the people are engaged, and which we must recognize as the foundation of our prosperity.

"We say, then, let us have a grand farmers' convention, for the purpose of taking into consideration such measures as may be suggested for the better accomplishment of the objects here indicated.

"We suggest that each and every agricultural and horticultural society in the State appoint one or more delegates to attend such a convention, to be held in the City of Jefferson, at or about the time of the opening of the next session of the Legislature, and that all farmers and others interested be invited to attend and coöperate.

"Societies and individuals who will respond favorably or otherwise to this suggestion, are invited to communicate the same as early as possible to the chairman of this committee, so that the result may be published and a call issued for a convention, if thought advisable.

L. D. MORSE,
A. W. MCPHERSON,
T. R. ALLEN.

"ALLENTON, Missouri, August 16, 1860."

—Which report, with the original preamble and resolutions, were printed as a circular and distributed among the known friends of agriculture throughout the State. The response to this circular was so far encouraging as to result in a farmers' convention, held in Jefferson City, on the first day of the session of the General Assembly, in January, 1861. That meeting, after discussing our agricultural interests, elected members for a board of agriculture, and appointed a committee to prepare a bill for its organization. The committee discharged this duty, but the Legislature then assembled, caring more for rebellion and the destruction of the Government than for promoting the real and permanent interests of the State, laid the bill on the table.

At the succeeding session of the General Assembly a new bill was prepared. Dr. Morse and myself visited Jefferson City, and laid the same before the Committee on Agriculture of the House of Representatives. A new Board was selected, representing nearly equally all portions of the State. That bill became a law at the adjourned session on the 1st of December, 1863. It provided for a meeting for organization on the second Wednesday of April following. When the time came, only four out of ten members appeared. Two subsequent attempts were made to get the Board together for organization. All failed for want of a quorum. It was then deemed best to ask of the General Assembly an amendment to the act, naming a new board of such friends of agriculture as we were assured would give the requisite attention. Such amendment having been procured, this Board was organized in accordance therewith on the 13th day of March last. Under all the disadvantages growing out of a devastating civil war in our State, it has required no small degree of perseverance and energy to accomplish the degree of success already attained; but these disadvantages have no doubt acted as a stimulus upon those who have taken an active part in the enterprise, understanding well the fact that the true way to recover from the debt and destruction of the war is to more thoroughly develop our productive resources. In this connection I cannot omit doing an act of justice to the labors of a devoted friend of the agricultural interest. To the energy and perseverance of Dr. L. D. Morse we are greatly indebted for the successful organization of this Board, and to his laborious attention to the duties of corresponding secretary for much of the information, statistical and otherwise, which will be laid before you at this meeting.

We are here now for the first annual meeting of the Missouri State Board of Agriculture, and I congratulate the members present upon the fact that peace and quietness again reign throughout our borders; that slavery, which, with the lights now before us, few can fail to see has acted as a curse and blight upon our prosperity, has been swept away from our noble State, and that a degree of unparalleled prosperity is before us, if we may judge by the flood of immigration now pouring into our midst.

The fifth section of the original act, establishing this Board, reads as follows:

SEC. 5. There shall be held in the city of St. Louis, on the first Wednesday of December of each year, an annual meeting of the State Board of Agriculture, for the purpose of deliberation and consultation as to the wants, prospects and condition of the agricultural interests of the State, to receive the reports of the district and county societies, and to fill, by election, all vacancies in the State Board of Agriculture.

One of the duties enjoined by this law is "to fill by election" the vacancies occurring in this Board at this meeting. The terms of office of Frederick Muench, Gert. Gœbel, Francis Kellermann, George Husmann and Henry T. Mudd, will terminate with this convention. The filling of these vacancies is one of the important and specified duties required of us at this meeting, and you will pardon me for asking of you, in the discharge of this duty, a very careful consideration in the selection of suitable persons of known agricultural intelligence and zeal, who will be willing to make such sacrifices of time, labor and means as may be required to secure the success of our enterprise in its infancy, and promote the agricultural interests of our State. The most important business of this meeting is that specified in the section I have quoted—"deliberation and consultation as to the wants, prospects and condition of the agricultural interests of the State." The law contemplated, or is based on, the probable existence of an agricultural society in each county in the State. It makes the president of each agricultural or horticultural society in the State, *ex-officio*, a member of the State Board of Agriculture, thereby forming a convention of farmers, composed of such men as would be likely to be familiar with the wants, prospects and condition of the agricultural interests of their respective counties. The Legislature presumed that a convention so composed would be thoroughly and properly informed in reference to all questions in any way affecting or connected with the prosperity of the farming interest, and, hence, provided that the General Assembly should be informed, by means of these conventions, what progress that interest is making and what legislation is demanded to promote and sustain its permanent advancement. To this end, county societies are requested to forward their annual reports to this meeting, and the State Board is, by section seven of the law, required to report to the General Assembly abstracts of said county reports; and in addition to all this, the State Board is required annually to present "a general view of the condition of agriculture throughout the State, accompanied by such recommendations, including especially agricultural education, as they may deem interesting and useful."

Gentlemen, the interest concerning which we are called upon to consult and deliberate, considered in its bearings and connections with other interests, is of a magnitude and importance greatly exceeding any other interest in the State, and it is our province, according to the

terms of the law, to present important facts connected with its history and progress in Missouri, and to submit well considered arguments in favor of measures which, in our judgment, should be adopted to subserve and promote it, and to respectfully urge them upon the attention of the General Assembly for their consideration and adoption. In doing so we but fulfill the mandate of the law, requiring the State Board so make such recommendations as they may "deem interesting and useful."

In view, then, of the comprehensive subject before us, and of its importance to the welfare and prosperity of the whole people of the State, permit me to urge upon you the necessity of thorough investigation, patient deliberation and wise counsels, in order that the results of this meeting may not only be profitable and creditable to those present, but useful and instructive to others.

Mr. Colman submitted the following resolution:

Resolved, That the Board now proceed to elect members of this Board in place of those whose term of service expires.

Mr. Harris inquired whether the election could not be deferred to the contemplated meeting at Jefferson City.

The President stated that the provisions of the law are positive that the annual meeting of the Board must be held in St. Louis on the first Wednesday of December in each year, and that the prescribed business, among others of the annual meeting, was to fill vacancies in the Board.

The resolution was then adopted.

The Hon. Alva Culver, President of the Ste. Genevieve Agricultural and Mechanical Society, presented his credentials and took his seat as *ex-officio* member of the Board.

Dr. Morse suggested that, to save time, members whose term of service expires be reëlected by acclamation.

Mr. Harris said he knew that to secure a quorum at meetings of the Board, it was necessary to select enough for that purpose in the immediate vicinage where the usual meetings are held, but still he thought there ought to be a better distribution of the remaining members throughout the State, so as to represent all sections.

Mr. Colman thought that as all presidents of agricultural and horticultural societies were *ex-officio* members, all sections of the State would be fully represented.

Mr. Husmann assented to the propriety of distributing the incorporate members of the Board more equally to all sections of the State, and as there was now a member from the county adjoining his own, and as he himself was an *ex-officio* member, he declined reëlection, in order that a member might be taken from the central or northwestern portion of the State.

Dr. Morse thought that entirely too much stress was laid upon being an incorporate member. In all States having a State agricultural

organization there was an executive committee, or business committee, who transacted all the business, conducted all the correspondence, collected all the statistics and made the annual reports of said organization. The incorporated members of this Board could only be regarded in this light, and were, in fact, constituted such by the *ex-officio* members of all the agricultural and horticultural interests of the State.

A letter from Hon. F. Kellermann, stating that he was about changing his business, and, therefore, might not be regarded as representing the agricultural interest of his county, and, therefore, declined a re-election.

Mr. Mudd was then nominated and reëlected.

Dr. Morse nominated Judge A. Culver, of Ste. Genevieve, in place of Mr. Kellermann, declined.

Mr. Colman objected; since Judge Culver was already an *ex-officio* member, we would gain nothing by duplicating membership.

Judge Culver declined, as he deemed it policy to have the Board as large and representing as much as possible the various sections and interests of the State.

Mr. Kellermann was then nominated and reëlected.

Mr. Muench was nominated and reëlected.

Mr. Husmann was nominated, but positively declined, and nominated the Hon. John W. Harris, of Boone county, who was elected.

Mr. Gœbel was nominated and reëlected.

Mr. Colman submitted the following resolution:

Resolved, That it is the opinion of the members of this Board that the law organizing this Board and making presidents of agricultural and horticultural societies *ex-officio* members, should not be changed by the Legislature.

Dr. Morse said that the subject involved was one of expediency, and if carried out to the extent claimed by Mr. Colman, might destroy the efficiency of the Board. At the annual meeting, which reorganized the Board, there can be no possible objection, but on the contrary, it is very desirable to have these *ex-officio* members representing all parts of the State. But the Board being organized, its first duty is to lay out the work for the ensuing year, and set about performing it. If this programme is liable to be changed by the external pressure of the *ex-officio* members, the harmony, utility and efficiency of the Board would be impaired. If the action of the Board, as organized one year, does not meet with the wishes and expectations of the *ex-officio* members, they can change it so that it will, at the annual meeting the ensuing year. His idea of the incorporated members was, as before stated, that they constituted an executive committee to transact the business, and report to the Board at the annual meeting. The meetings of the incorporate members of the Board are held by a special call of the President, to transact special business; the incorporate members could be notified of such meeting, but it would be utterly

impossible to notify the *ex-officio* members, neither knowing where to address them nor who they were, as they were liable to be changed by their respective societies annually.

Mr. Colman advocated his resolution at some length.

Dr. Morse replied that he had examined the organizations of the different States, and found that they uniformly had an executive committee appointed by the Board at its annual meeting, or a business committee, or an incorporated board of trustees, or State board, as with us, and that these attended to all matters relating to statistics, and made out the annual report. This is all he claimed for the incorporate members. If this is not their business, then the Board would have to appoint a committee for that purpose.

Mr. Mudd (Mr. Harris in the chair) advocated the adoption of the resolution.

The resolutinn was adopted.

On motion, the Recording Secretary was instructed to send a copy of the resolution to the Chairman of the Committee on Agriculture in the House and the Senate.

The Corresponding Secretary being asked whether he had any reports to submit,

Dr. Morse replied that he had reports from several counties, and promises from others. His own report could not be prepared and submitted before the next meeting of the Board.

On motion, the annual meeting then adjourned.

JOHN H. TICE, *Recording Secretary.*

ST. LOUIS, December 29, 1865.

The Board met pursuant to a call from the President.

There were present—Mr. Wm. T. Essex, of St. Louis county; Hon. Francis Kellermann, from Washington county; Hon. C. A. Newcomb, from Jefferson county; Dr. L. D. Morse and Mr. H. T. Mudd, of St. Louis county.

Absent—Dr. Geo. R. Buckner, of St. Charles county; Hon. Gert. Gœbel, of Franklin county; Hon. J. W. Harris, of Boone county; Hon. Frederick Muench, of Warren county, and Mr. B. Smith, of Crawford county.

The election of officers for the ensuing year being in order, an election was held, which resulted as follows:

President, Henry T. Mudd.

Vice President, John W. Harris.

Treasurer, Wm. T. Essex.

Recording Secretary, John H. Tice.

Corresponding Secretary, Dr. L. D. Morse.

The President made the following report on the application to railroad companies for facilities to members to attend the meetings of the Board and transacting official business:

Gentlemen of the Missouri State Board of Agriculture:

At your meeting on the 28th of March last, you directed me, by resolution, to lay before the directory of the railroads of the State the fact of the organization of this Board.

In compliance with your directions, I transmitted a copy of your resolution to the presidents of the St. Louis and Iron Mountain, the North Missouri and the Pacific Railroads, accompanying the same with a note saying that no compensation whatever was allowed the members of the Board, and asking that they be passed over said roads when in the necessary discharge of their duties as such members.

To this the Iron Mountain Railroad Company and the North Missouri Railroad Company promptly responded, by sending me passes for the gentlemen composing the Board, who had not already such passes as members of the General Assembly.

Colonel Taylor, President of the Pacific Railroad Company, acknowledged the receipt of my communication, saying he would lay the same before the Board of Directors. I am not informed as to what their action was, and am left to infer that some of the directors, at least, fail as yet to recognize that agricultural prosperity greatly promotes the success of railroad enterprises. In this connection I must add, however, that on being informed by me that a meeting of the Board had been called at Jefferson City on the 13th November last, Colonel Taylor promptly furnished me with passes for the members to and from the meeting, and I doubt not when it may be necessary that the Board meet at the capital of the State or elsewhere, the favor will cheerfully be extended again.

I have neglected to make application to the Hannibal and St. Joseph Railroad, but will do so at an early day.

The President reported that he had, pursuant to a resolution adopted by the Board, obtained from the State the amount appropriated, namely: One hundred dollars ($100 00); and that he had expended as follows:

To R. P. Studley & Co., for one ream of letter heads	$10 00
To same for 500 circulars	18 00
To L. D. Morse, express charges on books and postage stamps	19 20
To same, for sign of office	6 00
Total expenditures	$53 20

—Leaving an unexpended balance of forty-six dollars and eighty cents.

On motion, the report was accepted, and the President requested to pay the balance over to the Treasurer.

The committee to whom was referred the work of Hon. Frederick Muench, entitled "School of American Grape Culture," report that we have examined the same, and consider it a valuable addition to the agricultural literature of the State, and a useful guide to the amateur in grape culture in the West.

W. T. ESSEX, *Chairman Committee.*

Dr. Morse presented the following resolutions, which were adopted:

Resolved, That the Board of Agriculture respectfully and earnestly recommend the Legislature to request of Congress an extension of the term during which the Agricultural and Mechanical College may be provided by the State, of the character indicated by the act of Congress of July 2, 1862.

Resolved, That in the opinion of this Board, it is desirable that the Agricultural and Mechanical College should be put in operation at the earliest period practicable.

Resolved, That in the opinion of the Board, the fund arising from this grant will not be more than sufficient for the suitable endowment of *one* efficient college of the kind contemplated by the act of Congress.

Resolved, That the college indicated by the act of Congress is essentially unlike either of the existing colleges in the State, they being properly *literary* institutions, while this should be primarily designed and purposely adapted for the education and training of pupils for the industrial pursuits in life, as stated by the act mentioned.

Resolved, That such a college should not be incorporated with any of existing literary institutions of the State; because they are designed for and are adapted to a different style of education and training, and also, because a liability would thereby be incurred of an overshadowing influence from, or an ultimate absorption into the institution to which it is attached.

Resolved, That in the opinion of the Board an independent industrial college not only corresponds to the intentions of the grant, but that it would best promote and enlist the interest of the classes for whose benefit it was intended; that such separate and independent existence would be the unanimous preference of the agriculture of Missouri.

Resolved, That in the opinion of this Board, the grant being intended for the benefit of the industrial classes, and having been obtained by their efforts, its management should properly, legitimately and in justice be placed in their hands, or the hands of their representatives chosen for the purpose, and to this end a succession in the board of trustees or regents of the college should be maintained by nomination of the county agricultural and mechanical associations of the several Congressional districts of the State, and thus kept forever in the hands of its friends, and free from the baneful influence of politics.

Resolved, That the Industrial College should possess, as a part of its apparatus, a farm and workshop, which are as indispensable for prac-

tical instruction as philosophical or chemical apparatus is for scientific instruction; and that it should be located so as to be easily accessible by railroad and as nearly central to the State as may be, considering geographical position, population and social and other advantages.

On motion of Mr. Kellermann, it was

Resolved, That the Secretary make a short report, covering all the points upon which legislation is desired by this Board, and lay the same before the Legislature, as soon as practicable after its recess.

The following resolutions were presented and adopted:

Resolved, That we feel deeply interested in the great department of agriculture connected with our National Government; that we desire its entire success, and believe it destined to contribute immensely to the advancement of agriculture in the country; that we earnestly entreat the President of the United States to appoint a competent man to be the head of the Department of Agriculture, the incompetency of the present incumbent being a source of general remark and complaint from the intelligent agriculturists of all parts of our extended country.

Resolved, That in the opinion of this Board, a change in the head of the Agricultural Department is imperatively needed for the best interests of the producing classes of the country, and the President of the United States is most respectfully petitioned to listen to the complaints embodied in the foregoing resolution.

Resolved, That the Recording Secretary be instructed to furnish copies of the foregoing resolutions to each member of Congress from this State, with a request that they lay the same before the President.

On motion, the Board then adjourned.

JOHN H. TICE, *Recording Secretary.*

FORM OF CONSTITUTION

FOR COUNTY AGRICULTURAL SOCIETIES.

ARTICLE 1. This Association shall be styled the —— County Agricultural and Mechanical Society; its object shall be the improvement of agriculture, horticulture, mechanic arts, rural and domestic economy.

ART. 2. The officers of this Society shall consist of a President, Vice President, Secretary, Treasurer, and nine Directors. The President shall be chosen from among the directors, and no person not a member of the Society shall hold any office in it. The directors shall be chosen, so far as practicable, from different townships in the county, (and wards in the city) and a majority of their number shall constitute a quorum for the transaction of business.

ART. 3. The regular annual meeting of this Society shall be held at the time of the annual fair, which shall be fixed by the Board of Directors, and shall take place during the months of September or October in each year; at which time the officers shall be chosen by ballot, and shall serve one year, and until their successors are elected and qualified, provided, that if no fair be held, the annual election shall be held on the first Monday in October. Any vacancy which may occur in any of the offices may be filled by the Board until the next annual meeting.

ART. 4. Officers elected at an annual meeting shall not assume their duties till the first day of January following, (except it be the first organization of a Society,) and it shall be incumbent upon the retiring Board to settle up the business of their year, and they shall have till the time above specified to perform that duty.

ART. 5. The President, Vice President and Secretary shall constitute an Executive Committee, and shall have power to do all acts necessary for the prosperity of the Society in the intervals of the meetings of the Board, and the Vice President and Secretary shall be *ex-officio* members of the Board.

ART. 6. The duties of the President and Vice President shall be such as usually attach to such officers. The President, if possible, shall attend the annual December meeting of the State Board of Agriculture, and his traveling expenses shall be borne by this Society. In case it should be impracticable for him to attend said meeting, the directors or Executive Committee shall appoint some other member of the Society to represent them at that time.

ART. 7. It shall be the duty of the Secretary to keep carefully the records of the Society and all papers relating thereto; to respond promptly to all letters and circulars from the State Board; to make annually, before the first of December in each year, a report to the Corresponding Secretary of said State Board; which report shall embrace such items of information concerning the county Society, and such statistical and other facts as are required by law and as may be desired by the State Board, and to perform all other duties, under the direction of the Executive Committee, that may be necessary for the welfare of the Society, for which services he shall receive annually, as compensation, the sum of —— dollars. For failure to make the annual report of the Society as required by law and this article, he shall pay a fine, for the use of the Society, of one huudred dollars, which may be collected by law as any other debt may be collected.

ART. 8. It shall be the duty of the Treasurer to receive all moneys due the Society, and to pay them out on the order of the President, countersigned by the Secretary; and he shall give bond in the sum of —— dollars for the faithful performance of his duty.

ART. 9. This Society shall hold an annual fair, at such time and place as shall be designated by the Board of Directors.

ART. 10. The President shall have power to call meetings of the

Board whenever he may deem it important to do so, and the Board may call meetings of the Society upon due notice being given.

ART. 11. Any person may become a member of this Society, by signing this constitution. The privileges secured by such membership shall continue as long as the provisions of these articles are complied with, or until the name be stricken from the roll by vote of the directors.

ART. 12. At each annual meeting the vote shall be taken as to what amount the members shall pay, not exceeding five dollars, for the next year; and any member failing or refusing to pay the amount thus agreed upon, shall forfeit all the privileges of membership until said amount be paid. The dues of delinquents may be collected by law as any other debt may be collected.

ART. 13. The Board of Directors shall annually, prior to the first of March, establish a list of premiums to be awarded at the next fair, determine the time and place of holding it, and agree upon rules for its government; all of which shall be arranged and published.

ART. 14. Competitors for premiums must be members of this Society, or pay such fee for the privilege of exhibiting as the Society may prescribe; and all articles offered for premiums must be owned by the persons offering them, or by members of their families. In the department of mechanics the exhibitor must be the maker, inventor or improver.

ART. 15. Awarding committees of three persons each shall be appointed by the directors for judging the different classes and awarding premiums for the same.

ART. 16. No premiums shall be paid on field crops till the producer shall have furnished a full and explicit account of the variety and method of cultivation, which statement may be published. The premiums on these crops shall be awarded by the Executive Committee before they retire from office.

ART. 17. The Board shall have power to enact any by-laws and rules which may be deemed necessary for the good of this Society, provided they do not conflict with the provisions of this constitution and the laws of the State relating to agricultural societies.

ART. 18. This constitution may be altered or amended by a vote of the majority of all the members present and voting at any regular meeting.

NOTE.—The foregoing constitution was adopted by the State Board of Agriculture for recommendation to county societies. It is not, probably, faultless, or entirely adapted to every county. Its main features have been tried in some localities, with entire satisfaction. It is not, of course, obligatory upon county societies to adopt this constitution, yet it is desirable, so far as possible, to secure uniformity. In many points it has been carefully prepared, with reference to existing laws of the State in regard to agricultural societies.

Article second provides for nine directors. It is better to elect one from each township, so that each portion of the county may be represented in the Board. The State law, however, provides for nine, and it is enough, provided they are fairly distributed throughout the county.

Article third provides for holding the annual meeting and election of officers at the time of the fair. This is a common practice, and is, probably, best. My own experience, however, is to the contrary. Where this practice is adopted, the propriety of article four will be apparent.

The Secretary is the most important officer in the Society. If he is "the right man in the right place," he will make the Society creditable and successful. He is the *working man* of the concern, and if he is faithful and efficient, he not only deserves the thanks of the public, but some more substantial expression of their appreciation. He should be paid. He is required to make an annual report, and should be held pecuniarily responsible if he fails to perform that important duty.

The eleventh and twelfth articles contemplate a membership that is more permanent and reliable than usually prevails in county societies. As commonly organized, the payment of the dollar constitutes the membership, and there are no further responsibilities connected with it. On such a system, there are probably hundreds of farmers in every county who would become members only whenever they could save money by doing so; that is, when it would cost them as much or more to take their families to the fair on single tickets, or when they could carry off five or ten times the amount in premiums; but whenever the little advantage happened to be the other way, they would decline a membership, and go to the fair on a single admission ticket. It is difficult to make a society prosperous under such circumstances, and a membership more steady and reliable is needed. Therefore, the articles referred to make the signing of the constitution the act which constitutes membership, to be followed by the payment of the fee annually. There is little danger of being compelled to pay too much under this system, because the amount is decided by a majority of the members themselves, and is limited to five dollars by the law of the State. If a member should remove out of the bounds of the society, or have any other good reason for asking to have his name stricken from the roll of membership, the directors would certainly comply with his request, and record the fact upon the minutes, which would release him from further responsibility. This system has been tried with satisfaction and success.

The plan of life memberships has not been added in this constitution, but I think it a very excellent one, especially in forming new societies, where a large outlay is required for purchasing and inclosing grounds, erecting the necessary buildings, etc. A large number of the more affluent citizens of a county will readily subscribe for life

memberships, at a fee of ten to twenty-five dollars, receiving a neat certificate, which entitles them and their families always to free admission to the fairs. I have known societies at the beginning to obtain nearly sufficient means in this way to place them on a good foundation. Afterwards, there will always be some others who will add their names to the list of life members, and this, with the annual membership fees, gate fees and rents of refreshment booths, will be sufficient to keep the society in a flourishing condition.

Every society should organize so as to become a body corporate, and should, from the very beginning, aim at securing a suitable fair ground.

The importance of organizing county agricultural and mechanical associations in all the counties where practicable, in connection with the State Board of Agriculture, should be sufficiently apparent to all. As a means of eliciting and disseminating agricultural information, and stimulating improvement, such a system has been found, by long experience, to be most efficient.

L. D. MORSE, *Corresponding Secretary.*

APPENDIX.

I. COUNTY AGRICULTURAL REPORTS.

II. LETTERS ON FRUIT GROWING.

III. ESSAYS AND ADDRESSES.

IV. PROCEEDINGS OF THE MISSOURI STATE HORTICULTURAL SOCIETY, FOR 1865 AND 1866.

INTRODUCTORY.

At the second meeting of the State Board of Agriculture, held in St. Louis, on the 28th of March, 1865, the following circular was adopted, for the purpose of eliciting from county societies and prominent individuals in the various counties such information in regard to the condition of agriculture and the resources of the counties as was contemplated by the act incorporating the Board.

In the disorganized condition of the county societies, and in the absence of means in the hands of the Board, this was deemed the most feasible method for accomplishing the objects of the Board for the present year. It will be seen that very few of the individuals to whom the circular was addressed (it was sent to nearly every county) have sufficiently appreciated the importance of the work, or understood its object, to furnish the required information. Such as have complied with the request, have generally answered its intent very well—in one or two instances have rather exceeded what was contemplated—but as these more lengthy reports are quite interesting, and as other counties have not occupied the room, they are given entire. In one or two instances, some exceptions will probably be taken by others to the views expressed by the authors of reports, but this could scarcely have been otherwise. On the whole, the individuals making the reports, and the counties which have aided the work, are deserving of great credit. It speaks well for the enterprise of such counties, in regard to their most important interests, and will have a good influence in their favor.

Gasconade county made a report in 1864, in expectation that there would be an annual meeting of the Board that year; but an organization was not effected by the members first selected, for want of a quorum.

DECEMBER 22, 1865.

MISSOURI STATE BOARD OF AGRICULTURE,
OFFICE No. 12 NORTH FIFTH STREET, ST. LOUIS, June, 1865.

DEAR SIR: This circular is sent to you, with the hope that you will be able and willing to supply the desired information in regard to your county. It has been prepared by direction of the Missouri State Board of Agriculture, which was organized on the 13th of March last, pursuant to an act of the General Assembly of Missouri. It is made the duty of said Board to make an annual

report to the General Assembly, embracing the proceedings of the Board for the past year, an abstract of the report and proceedings of the several agricultural societies, as well as a general view of the condition of agriculture throughout the State, etc.

Where no county society exists, it is important to the county and the State that some person should take interest enough in the local and general welfare, to make or obtain a report, as full and complete as possible, of the condition, interests and prospects of the county. Such reports will form a part of the report of the State Board, and will be published in a volume for distribution throughout the State, for exchange with societies in other States, etc. You will at once see the importance of having your county properly represented in the report. In case you cannot give this matter the necessary personal attention, will you place it in the hands of some competent, public spirited person, who will attend to it? Persons furnishing such reports, or aiding materially in obtaining them, will be considered especially entitled to a share in the distribution of the volumes of the State report, and of such seeds, plants and documents as will be in possession of the State Board for that purpose.

Your intelligence and the position you occupy, lead us to apply to you to furnish the paper for your county. If you will undertake that duty, please inform me by return mail. If you decline, so far as we know at present, your county will not be represented in the book. We are aware that it is difficult to get men who are qualified for the task to undertake it, as no little labor will be required in its performance, if done carefully and correctly. Your county could well afford to pay a competent person for doing this work. There is at present no means in possession of the State Board for such purposes. Should the Legislature, when again convened, however, see fit to establish a permanent agricultural fund, or otherwise make an appropriation for agricultural purposes, the Board will undoubtedly be in favor of remunerating you as fairly as possible in accordance with the merit of the work performed.

The name of the author will appear at the head of each paper, so that the credit or responsibility may be placed where it belongs.

It is desirable to obtain the full and complete topography of your county, its character, soil, productions and resources; and in order to obtain some uniformity, it is recommended that you follow the subjoined interrogatories, as nearly as circumstances will admit, in the order in which they follow:

GENERAL DESCRIPTION. What is the general character of your county, its surface, soil, etc.? Its rivers, their width, depth, force of current? Its creeks and springs, are they durable? Is the water hard or soft? Do your streams afford available water power for manufacturing purposes?

TIMBER, ETC. What varieties of timber trees are most abundant? Give us a full list of your timber trees as convenient. What kinds of wild fruit? What the principal wild shrubs, vines, etc?

LANDS. Have you any government lands in your county? If so, how much, and what is their character? Is there much land in your county owned by non-residents or by corporations? What corporations? What is the average price of improved farms? The average price of improved lands?

MINERALS. What kind of rock or stone have you? Have you any coal, has the vein been opened, how thick is it, and the depth below the surface? Does iron, lead, copper or other ore exist in your county? Have any mines been in operation, and with what success? Are there any indications of coal oil? Have any experiments been made in boring for it?

MILLS. How many flouring mills, foundries, woollen factories, etc., have you?

IMPLEMENTS. What implements are being used, and with what success? Are there any agricultural implement manufactories in your county? If so, where are they and who are the owners?

AGRICULTURAL SOCIETIES. Have you had, or have you now, a county agricultural society, or any farmers' clubs, or horticultural societies? If so, what have been the results? Give as full a history of such societies as you think will be useful and interesting, the names of those who were most active in organizing them, the names of the last or present officers. Have you had any fairs? If so, general remarks on effect of those exhibitions.

About what proportion of your county is in cultivation? How many inhabitants?

What are your principal productions?

WHEAT. What is the average yield per acre among the best farmers? What the average per acre in the county? Is spring or fall principally cultivated? Has sub-soil plowing been tried? Has the drill been tried? Has under-draining been tried? If so, with what success? The aggregate amount raised in the county.

CORN. What is the average yield per acre? What varieties? Which varieties are considered best for stock? In what manner is it generally fed? How is the corn crop marketed? Can you give the aggregate amount in the county?

RYE, OATS, BARLEY, BUCKWHEAT AND POTATOES. Follow the same interrogaties, as far as practicable, as above.

SORGHUM. To what extent has sorghum been cultivated in your county? What varieties are in cultivation, and with what results? What kind of soil is considered best? Has sugar been made from it? What implements are in use for its manufacture?

HEMP. Is hemp cultivated? If so, with what success? The yield per acre.

FLAX. Is flax cultivated to much extent? If so, is it raised for the seed or fibre, or both? Yield per acre of seed, straw, lint.

COTTON. Has cotton been grown in your county? What is the average crop per acre? On what soil does it succeed best?

TOBACCO. Is tobacco grown for market in your county? To what extent? Average yield. What varieties? Which is considered best, and why? Methods of hanging and curing. Is the crop peculiarly impoverishing to the soil?

SHEEP. How much wool is producted for export? What breeds? Are there any large flocks? Who has them? What are their advantages for pasturage? Are sheep generally healthy? Does the wool become coarser on imported animals? Is much injury incurred by dogs?

HAY AND TAME GRASSES. Is any attention paid to the cultivation of tame grasses for pasturage? What varieties? With what success, and what are the advantages? What the average yield of hay to the acre?

HEDGES. Has hedging been tried? How long since commenced? What plant? What success? Do the winters injure it? What are the opinions with regard to hedging of those who have tried it?

HOGS. How many are slaughtered for export, or driven to market from your county? What is the average weight? Have any improved breeds been introduced? If so, by whom, what are they, and with what success?

CATTLE. How many are slaughtered for export, or driven to market from your county? How many of all ages are in the county? Have any improved breeds been introduced? By whom, and what are they? Is any person breeding especially for the dairy? Are there any dairies of consequence in your county?

HORSES. How many horses are raised annually? What is the average price? What class of horses is mostly raised? Is there any effort to improve the breed? In what direction is that effort being made?

MULES AND ASSES. How many are raised in your county? Where are they marketed, and what price do they bring?

A little schedule of your premiums, as awarded for several years past on stock, would be interesting.

FRUIT. Are your people generally raising orchards? With what success? Have you any professional fruit growers? Who are they? How long have they been in the business? If you will send me, immediately, the address of professional fruit growers, or any one who, from experience or observation, is qualified to give valuable information in regard to any class or classes of fruit, special inquiries will be addressed to such persons.

VINEYARDS. What is the aggregate number of acres of vineyards in your county? What varieties are chiefly cultivated? With what success? The average yield per acre. You will confer a favor if you will send the address of principal vineyardists, so that special inquiries may be addressed to them.

Conclude your report with such remarks on the soil, improvements in cultivation, adaptation to special crops, or particular modes of farming, whether stock, fruit or mixed farming, etc., as may suggest themselves to your mind, having the object continually in view to make a reliable, full and complete description of the agricultural resources of your county, that it may be a paper of reference to present and future generations.

It is desirable that your report be received as early as November first, or at least not later than the annual meeting of the State Board, which will be held in the city of St. Louis, on the first Wednesday in December.

L. D. MORSE, *Corresponding Secretary.*

COUNTY REPORTS.

AUDRAIN COUNTY.

BY O. A. A. GARDNER, UNITED STATES ASSISTANT ASSESSOR.

Our county is generally high and rolling, prairie land predominating. The soil is mostly of a clayey loam, which is slightly retentive of moisture, but when cultivated and fall-plowed, becomes light and highly productive. The fine sand with the clay tends to make the soil warm up quick when the spring opens.

There are no rivers proper in our county. The principal streams are Cuivre, Hickory creek, Littleby, Salt river, Young's creek and Saline creek. These streams are small, none averaging over a rod in width in the dry seasons. The current is not rapid in any of the steams. But few springs are found in the county. The water in all the streams is soft.

I believe there is not a developed water power in the county, though there are a dozen sites for mill seats. There have been several water mills in this county, but steam, being so convenient to locate, has superseded them in propelling our mills and factories.

Timber is tolerably plenty along all the streams, and most of it is of a good quality. White oak, hickory and black oak are the most abundant, while burr oak, elm, maple, walnut, sycamore, linn or basswood, birch, etc., are found quite plentifully, and of a size suitable for sawing. Grapes, plums, gooseberries, blackberries, strawberries, etc., are the most kinds of wild fruits, and, in their season, are usually quite abundant.

There are no government lands in this county; but there is a large amount of land, held by both residents and non-residents, that is in market at reasonable rates. The average price of improved farms is about $15 per acre, and for unimproved, $7.

Building lime and sandstone are abundant. Fire and potter's clay have been found. Coal of a good quality is abundant in nearly every township in the county. Most of the coal thus far mined has been by "stripping"—taking off the dirt and then digging up the coal. So far as I know, there is but one mine worked under ground. The average depth of the veins is probably about twenty inches.

There are several small flouring and quite a number of saw mills in the county; only one woolen factory and no foundry or machine shop, though a machine shop is to be put up in the spring, and a foundry added probably in the fall following.

Improved farming implements have been bought and introduced to a greater extent during the past year than ever before. I could not give you a list of the *kinds* that have been introduced, nor even the kind of mower or plow that is *most* used.

An agricultural society was organized here several years ago, and held one fair. It was a joint stock company, incorporated by special act of the Legislature, and has, I believe, died out. The fair held here was a decided success, as I learn, but the war broke out and the fine buildings and fixtures erected by the company, at a cost of several thousand dollars, have all been destroyed, and the ground left denuded of the beautiful shade trees that adorned it. So far as I know, there have been no farmers' clubs, or horticultural societies oganized in this county.

From the best information I can get, I should say not over one-tenth of the land in this county is in cultivation. There are about 6,500 inhabitants now in the county.

The productions of this county are chiefly corn, wheat, rye, oats, buckwheat, potatoes, sorghum and tobacco, leaving vegetables and fruits to be accounted for a garden production. I cannot approximate with any degree of certainty the average yield of any of these articles. Of wheat, the winter varieties are raised almost exclusively. Sorghum has been raised quite extensively this year, and the produce has been good both as to quantity and quality. No sugar has been made from the cane, or any attempt to make it, though it grains readily in most every farmer's barrel. The cast iron roller mill and Cook's evaporators are considered the best implements for working up the cane, though many are using the wooden mills, and boiling in common cast kettles or iron-bottomed boxes.

Under-draining and sub-soiling are unknown here. I have seen but one sub-soil plow in the county, and cannot hear of even enough under-drain to make one-fourth of a mile in length.

Considerable wool is produced in this county, but not much for export. I do not know of any one who makes wool raising a business to any great extent. The wild pasturage is good and sheep healthy, and if our legislators will only tax down worthless dogs, we may reasonably hope for an increase in the amount of wool raised in our county.

Timothy, clover and Hungarian grass are raised quite extensively.

Considerable hedging was put out before the war, and some of it has done well, while the rest has failed; probably the failures were in proportion to the neglect in attending to the hedge the first years of its growth. The Osage is the only plant tried.

Horses, mules, cattle and hogs are raised here; but I have no means of getting anything like the number marketed from here, or the aver-

age weight. Not much has been done by way of improving or introducing new breeds of cattle or hogs.

Our people are beginning to wake up to the importance of fruit culture. The few who put out fruit trees ten years ago, are receiving their reward now, and their success is stimulating others to plant quite liberally. Our land is well adapted to the cultivation of all the finest fruits, and ere long we will make rich displays of them at our horticultural gatherings.

There is no vineyard of any size in our county, but enough grapes have been raised in different parts of the county to demonstrate our ability to raise them plentifully. Several of our citizens are fixing to plant more grapes in the spring, and some have planted this fall.

In conclusion, I would say, our county, though well adapted to the cultivation of all the cereals, is, in my opinion, to become famous for its fruits. When our lands are properly under-drained (and no one in North Missouri need expect to raise the finest fruit without under-draining), and the sub-soil plow is found on every farm, as it should be, then we shall be able to show as fine fruits as can be raised anywhere. Fine flavored apples, luscious peaches, melting, sweet and juicy pears, exhilarating grapes, and all the fine small fruits which richly reward the careful cultivator, both in pocket and healthy table delicacies, and our people will soon see it in full force.

Our market facilities are good, and very soon will be unsurpassed. The North Missouri Railroad runs through the entire length of our county, giving us a market through to St. Louis, and in a few years this road will be completed to the Iowa roads, and then we can have a northern market for all our fruits.

MEXICO, December 5, 1865.

BOONE COUNTY.

COLUMBIA, November 22, 1865.

L. D. Morse, Secretary Missouri State Board of Agriculture:

Your printed circular of June last has lately been handed to me, with the request that I would supply the desired information. The time for publishing the annual report is so near, it will not be possible to furnish as full information as the importance of the subject demands.

I proceed to follow your interrogatories.

The general surface of this county is gently undulating, and the great body of the soil rich and productive. The Missouri river forms the southern boundary. Several small streams which rise in the north-

ern and northwestern part of the county unite and form the Roche Perche, which runs into the Missouri river about ten miles below the town of Rocheport, which is in the southwest corner of the county. At this last named point is the mouth of the Moniteau, a stream of less size, and forming the boundary line between Boone and Howard for ten miles from its mouth. Cedar creek, a stream about forty miles in length, has its source in the northeast; forms part of the boundary between Boone and Callaway, and flows into the Missouri river nearly opposite the City of Jefferson.

There are some lasting springs of pure water, but, as a general thing, cisterns are used for drinking and family purposes, and ponds for stock. No streams that afford available water power the whole year, for manufacturing purposes.

TIMBER is abundant and of fine quality, consisting chiefly of oak, walnut, ash, hickory, sugar-tree and elm; undergrowth, hazel, sumach, pawpaw, dogwood and redbud.

WILD FRUITS. Grapes, haws, blackberries, crab apples, plums, hickory nuts, walnuts and hazel nuts.

There is no land owned by the United States Government, but little by non-residents, ten or twelve acres by the Boone County Agricultural Society, a few acres each by two female colleges at Columbia, where the State holds a small tract on which is the University of Missouri.

The average value of improved lands is about twenty dollars per acre; of unimproved, from five to ten dollars.

LIMESTONE ROCK, of fine quality, abounds in different parts of the county. Flintstone is found in the beds of many of the small streams; sandstone, in a few places only.

COAL is found in large quantities, and several fine veins have been opened, from which the city of Columbia is abundantly supplied. No iron, lead or copper has been discovered, and there are no indications of coal oil.

MILLS. There is a fine flouring mill at Columbia, one with a steam distillery connected at Rock Bridge, five miles southwest; one at Rocheport, and a water mill on Cedar creek, which runs about half the year; also, two steam mills in process of erection.

Reaping and mowing machines have been much used. Corn planters and gang plows are being introduced, but there is no manufactory for such implements in the county.

The Boone County Agricultural and Mechanical Association was organized June 5, 1852. Annual exhibitions of stock, agricultural products, etc., have been held, excepting the years 1861-2-3 and 1864. The exhibition of 1865, although not equal to those before the war, was very satisfactory, and evinced much of the old spirit and pride of Boone in having the finest of all kinds of stock. The present officers are as follows: President, Michael Fisher; Directors: W. H. Bass, Jno. Machir, Jas. B. Ruckle, Jno. F. Baker, Jno. S. Clarkson, Henry Keen,

Robert Lemon, Otho Barnes, W. N. Beattie and Jno. M. Samuel, Secretary.

About one-half of the land is in cultivation, and, according to the census of 1864, the population was 15,774. Owing to existing troubles at that time, growing out of the rebellion, it was impossible to obtain a correct enumeration. There are over 20,000 inhabitants at this time.

The chief products are corn, oats, wheat, rye, timothy, hemp, tobacco and potatoes.

WHEAT. The average among the best farmers is about twenty bushels, and probably fifteen bushels in the county. Sub-soil plowing has been tried only in a few instances. The drill has been used with success and advantage. The aggregate bushels produced in 1864 was 57,798.

CORN. Average yield per acre, forty bushels. A large part of the land is capable of yielding from sixty to eighty bushels, with proper cultivation. The white and yellow corn are both extensively planted; the latter being esteemed better for feeding stock by many farmers. The most common way of managing the corn crop (except what is cribbed for bread and seed) is to cut up the stalks in September and October, then feed the whole in pens. The surplus is marketed by feeding stock.

OATS have been extensively grown, and esteemed by our best feeders as a valuable crop, and very certain to yield well. There have been several short crops of late years, and the average yield has declined from thirty bushels to less than twenty bushels per acre. The amount reported, in 1864, was 45, 945 bushels.

TOBACCO. This crop was grown to considerable extent in 1864, and the aggregate was set down at 362,901 pounds. There was but little planted in 1865. Some of our lands, known as white oak land, produce a very fine quality.

POTATOES. Irish and sweet potatoes grow well. I have no means of ascertaining the aggregate product.

SORGHUM is becoming more extensively cultivated. A majority of the farmers plant a few acres. Over thirty thousand gallons of molasses have been made this fall. No sugar has been made from it.

HEMP. Since the change in our labor system, hemp is not cultivated to any extent, although the bottom lands, and some of the uplands, will yield from six to ten hundred pounds per acre.

RYE is sown by comparatively few farmers, and used chiefly for early grazing.

SHEEP. The Spanish Merino, Cotswold, Leicester and Southdown breeds have all been introduced and crossed with the common stock of the country, until almost every herd is free from what is known as "scrub sheep." There are several herds of from three to eight hundred head, but it is most common to find from fifty to one hundred on a farm. The aggregate number reported in 1864 was 46,611 head.

Considerable loss is incurred annually from dogs. I cannot say what per cent.

TIMOTHY, CLOVER AND BLUE GRASS are extensively cultivated, with fine success. The average yield of timothy per acre is about one and one-half tons. Blue grass is becoming much used for winter grazing, and is estimated by our best farmers as being equal in value to the same number of acres of corn.

Hogs—aggregate number in 1864				17,860
Cattle,	do	do	do	10,538
Horses,	do	do	do	4,462
Mules,	do	do	do	1,822

These four kinds of stock have all been highly improved by the introduction of the best breeds from all parts of the Continent and from Europe. Attention has been paid to every class of horse stock adapted to the saddle, harness, draft and pure blood, and the improvements have been greatly encouraged by the annual exhibitions of the county society.

The chief market for mules, before the war, was found in the cotton States, Arkansas, Louisiana and Texas, at an average price of from one hundred and fifty to two hundred dollars per head.

FRUITS. Many fine bearing orchards of apples, pears and peaches are found in all parts of the county, and every year the number and variety are increased.

Grapes are planted in small quantities, for family use. There are no vineyards for making wine.

The great source of wealth to the county is stock raising, and no other in the State is more noted for its fine horses, mules, jacks and cattle; hence, corn, oats, blue grass, clover and timothy are regarded as the most valuable crops, and are mostly fed on the farms that produce them.

There is a growing disposition among the farmers to grade and macadamize the principal thoroughfares, and a railroad connecting Columbia with the North Missouri Railroad will most likely be built at an early period.

Several intelligent, enterprising men, with considerable capital, from other States, have lately purchased property in the county, and in a very few years the greater portion of the land will be reduced to cultivation and productiveness.

Respectfully,

D. H. HICKMAN.

BATES COUNTY.

PLEASANT GAP, October 20, 1865.

L. D. Morse, Corresponding Secretary:

SIR: I undertake to answer your circular as nearly as I can do so, that you may receive it by the first of November.

STREAMS. Bates county is a prairie county, with an undulating surface; very rich soil. The principal river is the Osage. It is about 250 feet wide, with a swift current in some places, and, at others, eddies. The next principal stream of the county is Grand river. It runs through the north part of the county, and is somewhat less in size than the Osage. Both streams are well adapted to water power purposes. The water is both hard and soft. The principal creeks are Deepwater, Elk Fork, Panther, Miami, Mulberry, Mound and Mormon Fork. These creeks traverse different parts of the county, and are not very well adapted for water power purposes.

TIMBER. The principal timbers are black walnut, burr oak, white oak, post oak, hickory, pecan, hackberry and cottonwood. With respect to wild fruit, the county abounds in wild plums, wild cherries and grapes.

LANDS. There are no government lands in the county. About half the land in the county is owned by non-residents.

MINERALS. Coal of an excellent quality abounds in all parts of the county. The layers are of different thickness, in some places four or five feet thick, and in others eighteen inches. It generally lies from three to six feet below the surface. There is abundant indication of coal oil near the village of Parkerville, on the southeast quarter of section twenty-eight, township forty-two, range thirty-two. On the land of Mr. John Tate, there is a remarkable spring of fresh water, out of which a vein of oil runs in warm weather. The oil comes from the bottom of the spring, and floats off on the surface of the water, and is very inflammable. About two miles east of this spring there is another similar spring running out of the banks of Mormon Fork creek. I learn there is a company making preparations to sink a well near the spring at Parkerville.

PRODUCTIONS. Wheat is not very extensively raised, but could be if farmers were to turn their attention to it. Corn is raised extensively, and averages about fifty bushels per acre upon the natural prairie soil of a seasonable year. It is generally fed to cattle; and when the cattle are fat, driven to Pleasant Hill, and there put on the Pacific Railroad and sent to St. Louis and sold. Rye, oats, buckwheat and potates all grow very well; but I am unable to give the exact amount grown per acre. Sorghum is extensively grown, and the people manufacture it into syrups for their own use, but as yet no sugar has been made from it in this county that I have learned of.

Cotton, hemp, flax and tobacco have all been grown in this county more or less, but I have not noticed those crops enough to give much information concerning them. Sheep are raised easily, and are very healthy, and have all the advantages that a wide, boundless prairie of rich nutritious grass can afford. As to breeds, there is considerable variety and many large flocks, and sometimes a good many are killed by dogs and wolves.

GRASSES. Blue grass and clover grow better than in any place I have yet seen. Since the destruction of the farms in this county the most of the fields are covered with a rich growth of blue grass.

HEDGING. Hedging has been very successfully tried in this county, and is the most practicable system of fencing in this prairie country. The plant used is the Osage orange, commonly called "bodark," [*bois d'arc*]. The winters do not injure it any.

STOCK. Horses, cattle, mules and hogs are all raised to perfection. Since the war has occurred, no definite information can be given as to breeds and the best mode of raising.

FRUIT. Peaches, apples, pears and plums grow well in this county. I question much if there is any part of the United States better adapted to apples than Bates and adjoining counties. There were several professional fruit growers engaged in the business before the war, but the abrasions of the war broke up their business and destroyed their nurseries, so there is none now that you can correspond with; but now the war is over, and the county government again organized, and the people filling the county, all branches of human industry will be resumed.

The above items are necessarily brief, but are as full as I can well make them now. If they are of any use to you, it is well; if not, they cost you nothing.

Respectfully,

VAN BUREN VANDYKE,
Assessor of Bates county, Mo.

CLARKE COUNTY.

BY J. T. CALDWELL.

The general character of Clark county, Missouri, in reference to the division of its soil, may be stated as follows:

Perhaps fully one-half of the tillable soil is bottom and upland prairie, every acre of which is, or can be made, available for agricultural purposes.

One-half of the county is timbered land, conveniently located for use on the prairies, or wherever needed.

It is principally level, rolling, and in some instances hilly and abruptly bluffy in its topography.

The prairies are level, gently undulating and rolling, diversified with numerous springs, small branches of creeks and draws.

The timbered districts are level, rolling, hilly and bluffy, frequently interspersed with springs, creeks, ravines, vales and smooth bottom lands.

The soil is variable. In the bottoms it is usually rich, dark, loamy or sandy; on the hills and bluffs, strong, dark, slightly stony and intermixed with clay.

Our prairies are perfectly splendid in their appearance and matchless in soil, a rich black loam, with clay sub-soil. They are susceptible of the highest state of cultivation, teeming with magnificent crops of cereals, grasses, tubers and roots; covered with excellent orchards, while countless herds of cattle, horses, sheep, swine and all the herbivora, dot the vast expanse uncultivated, pleasing the eye, exalting the understanding, and whispering to the observant, reflecting mind a faint dream of fabulous, inexhaustible wealth, to be realized in future generations.

The northeastern boundary of our county is washed by the waters of the Des Moines river a distance of thirty (30) miles, forming a tributary of the grand old Mississippi, which flows past our eastern boundary a distance of thirteen (13) miles. Enough is known of the Father of Waters to require no further remarks from us; rather let us turn to the more unobtrusive, less known, but none the less beautiful Des Moines.

This is decidedly the most attractive and picturesque river in the West. It is navigable in the spring time a distance of two hundred (200) miles for ordinary light draught boats. Smaller crafts, propelled by steam, have gone as high as Fort Clark, a distance of three hundred and forty (340) miles.

Its width is two hundred and fifty (250) to three hundred (300) yards. The force of current, at ordinary stages, is four (4) miles an hour, and its depth, at a low stage, two and one-half (2½) to three (3) feet.

There is no river in the West producing a more inexhaustible, and at the same time easily accessible water power, or presenting better locations for the erection of manufactusing works.

No county presents better facilities and more natural resources for the speedy and economical construction of works of this character, while no county in the West, just at this time, offers greater inducements to capitalists and men of practical experience to embark in this enterprise.

Speaking of the Des Moines and Mississippi rivers, calls to mind a decided tendency on their part to inundate, during the spring freshets, some of the richest bottom farm lands in the county, extending longitudinally a distance of four (4) to (6) miles, and latitudinally about twenty (20) miles. This difficulty could be obviated at a com-

paratively trifling cost, by building a dyke or levee, similar to those erected on the lower Mississippi.

About six (6) miles distant from the Des Moines, and running parallel with it, is Fox river, a small, slugglish stream, somewhat used for a water power, but not so much as formerly. Since the settlement of the county the water runs off more rapidly, and there are times when water enough to turn a wheel cannot be obtained. It is affected by drouth, and depends principally upon its tributary creeks and branches for its volume of water. It empties into the Mississippi.

The Wyaconda river sweeps through the southwest corner of the county. It is a small stream, possessing the same general characteristics of Fox river, and affected by the same influences.

Between Fox and the Wyaconda rivers are Sugar and Honey creeks. (We only lack a milk creek to offer to the world that country described as "a land flowing with milk and honey.") These creeks are simply what their names imply, and need no further comment.

We have a number of durable springs in the county, and more constantly being developed as the county progresses.

There is most excellent water accessible in all parts of the county at a depth of ten (10) to forty (40) feet.

Our well water is all hard, though some of our springs afford excellent soft water.

A great many of our stock raisers are constructing artificial ponds or reservoirs, the clay sub-soil holding water well. These ponds are very serviceable and durable.

It may not be amiss to state here that, comparing our resources, natural advantages, proximity to rivers, railroads, etc., such is the desire of our citizens to encourage a good class of immigration, that we are selling lands fifty per cent. cheaper than any other county in the State.

We must not omit some mention of the railroad which runs through our county, and to which the county has subscribed liberally. It is the Alexandria and Bloomfield Road, and is being constructed as rapidly as can be effected by a large working force.

We may expect, at no distant day, to see the iron horse flying rapidly over our beautiful county, laden with the rich treasures of our fertile and productive land. In the language of Dow, Jr., "so mote it be."

TIMBER. The most abundant kinds of timber in Clarke county are white and red oak; besides these we have an abundance of burr, Spanish, black, post and pin oaks; also an average allowance of the following varieties of timber trees, viz: Black and white walnut, white and red elm, white and red linn, hackberry, mulberry, box elder, sycamore, cottonwood, white and red cedar, white and blue ash, white and shellbark hickory, sugar maple, white maple, honey locust, coffee nut, pecan, persimmon, dogwood, redbud, service berry, quakenasp, willow and wild cherry.

Of native wild fruits we have the following varieties: Crab apple, wild cherry, choke cherry, plum, black and red haws, hog haws, persimmon, blackberries, raspberries, strawberries, dewberries, gooseberries, (two varieties, one burr and one smooth,) service berries.

Of vines and shrubs we possess the following: Blue grapes, bird grapes, swamp grapes and fox grapes, sweet brier roses, white and red roses, thornless, red and yellow honeysuckle, redbud, Indian arrow, red and white cedar, piney and sarsaparilla.

This county is amply timbered, being at least one-half covered with dense growths of every variety above enumerated. The supply will more than equal all demands for centuries. There are large quantities of excellent white oak bordering on the Des Moines river, suitable for boat building, with ample supplies of walnut and cherry, employed in finishing and fine work. There have already been numerous hulls constructed on the Des Moines river for barges and steamboats.

LAND. There are about one hundred and sixty (160) acres of government land in the county, very poor, and entirely worthless—not fit for pasturage. About one-fourth (¼) of the land in the county is owned by non-residents. There is no land owned by corporations. The average price of improved farms is at least twenty-five dollars ($25) per acre. The average price of unimproved land is about fifteen dollars ($15) per acre.

MINERALS. We have an ample supply of gray, white and blue limestone, gray granite, white and yellow standstone, blue soapstone, black and yellow slatestone. We have an abundance of bituminous coal, also some cannel coal. We have some fifteen (15) veins of bituminous coal that have been and are now open and worked to some extent. The veins will average from two (2) to three (3) feet in thickness, and are usually from (10) to twenty (20) feet below the surface. Iron ore exists in limited quantities, not sufficient, however, to justify the erection of furnaces, so far as yet discovered. Blossoms of lead have been found in small quantities, but of no nominal value. There is no copper or other ore than those above enumerated. Mining operations have been restricted entirely to coal, with great success, presenting a fine opening for the successful employment of large capital.

Bordering on the Des Moines river are excellent indications of petroleum, which, in our opinion, could be easily reached in paying quantities at a depth of one hundred and fifty (150) to two hundred (200) feet. It remains undeveloped as yet, from lack of necessary capital to prosecute the work to a successful termination. A company are engaged in sinking a well for petroleum at Farmington, Iowa, an adjoining county, with favorable prospects of success, at (80) feet below the surface.

MILLS. There are four (4) flouring mills in the county, located at the following named points: One extra fine, large mill at Athens,

water power; one extra fine, large mill at Alexandria, steam power; one mill near Winchester, steam power; one mill at Waterloo, water power.

FOUNDRIES. There are none in the county.

WOOLEN FACTORY. There is one woolen factory at Athens, with inexhaustible water power, presenting a fine opening for the investment of capital. This factory has a massive solid masonry foundation, sixty by one hundred (60 by 100) feet dimension. The superstructure, at present completed, is only sixty (60) feet square and five (5) stories high, working one hundred and twenty (120) spindles, six (6) looms, one (1) breaker, one (1) condenser, etc., with two (2) carding machines. There is no better sheep country in the West than this. The market at home will absorb the total manufacture. The property is eligibly situated with regard to accessibility, railroad and river transportation being available. It is situated on the south bank of the Des Moines river, twenty-five (25) miles above its junction with the Mississippi river. All that is necessary to make a first class factory is capital.

IMPLEMENTS—*Plows.* For breaking, the improved diamond plow is generally used. For plowing corn, the single diamond is used. We also have the Wood's (Warsaw, Ill.,) improved diamond, one (1) and two (2) horse. The Moline (Illinois) plow (John Deere) is much used; also, the late William McCown's improved diamond, manufactured at Athens, in this county. It is the impression generally among farmers of this county, that McCown's improved diamond is best adapted to their necessities. The old Kentucky shovel plow is much used. The buggy (riding) plow, two (2) horse, has lately been introduced into the county, Stafford's patent, manufactured at Mount Pleasant, Iowa, being most successful. Wood's patent (Warsaw, Ill.,) subsoil plow has been introduced, to some extent, with good success; also, Wood's (Warsaw, Ill.,) rolling cutter sod plow obtains, working most satisfactorily.

Cultivators. There are several varieties of these in use, manufactured in the county, though none of them patented, so far as we can learn.

Corn Planters. We have several patterns of corn planters in use, but by far the best and most successful of these, is one patented and manufactured at Camp Point, Illinois.

Reapers and Mowers. We have in use McCormick's combined reaper and mower, Manny's reaper and mower, the Buckeye reaper and mower, and the Hersey reaper and mower. They all work well, but McCormick's improved combination self-raker is, par excellence, the machine for this country.

Threshing Machines. There are several patents of this class of machinery at work in this county. The most successful of these are the machines manufactured at Racine, Wisconsin, and Alton, Illinois, both being highly creditable to the inventor.

Ditching and Leveeing Machines. There have been two in use in this county, of Eastern manufacture, doing the work admirably.

Hay Presses. We have several varieties of these, but the one entitled to most consideration is the Mormon beater, manufactured at Galesburg, Illinois.

Corn Shellers. Wickersham's double sheller is the best implement of the kind, manufactured at Keokuk, Iowa. We have an abundant supply of patent hay rakers, stacking forks, scythes, harrows, and all the minor class of implements in general use in a farming community.

Manufacturers of Farming Implements. Messrs. Boler & Hanson, Athens, Clark county, manufacture wagons, several varieties of plows and have purchased the right to manufacture Stafford's patent buggy plow. M. M. Doud, Athens, Clark county, manufactures carriages, buggies and wagons. A. M. Faxton, Athens, manufactures fire arms, carriages, buggies and wagons. Captain Hazel, Acasto, manufactures the improved diamond plow, one and two horse. Daniel Sickles, Waterloo, manufactures buggies and wagons. Mr. Early, St. Francisville, manufactures buggies and wagons, also engaged in undertaking. There are manufacturers of wagons and plows, at Luray, Fairmount and Winchester, in this county.

AGRICULTURAL SOCIETY. First organized in 1854, by the election of the following named gentlemen as officers: Willis Curd, Esq., Waterloo, President; Judge Robert A. McKee, Waterloo, Vice President; John P. Hampton, Esq., Waterloo, Secretary and Treasurer. The fair grounds are handsomely located, at Waterloo, the county town of Clark county, Missouri, and embrace eight acres of land. Stock was originally taken to the amount of twelve hundred dollars ($1,200), at thirty dollars ($30) per share. This amount being insufficient to complete the fair grounds, six hundred dollars ($600) additional were raised by sale of shares at ten dollars ($10) each. The society progressed rapidly each year, until the culmination of our political troubles in open rebellion. The fall of 1860 witnessed the last regular annual meeting of the society under the old *regime.* Many of the original shareholders joining the rebellion, and others the Federal forces, the stock fell below par, and in many instances was frittered away for a mere trifle. The whole amount of stock, however, was absorbed by the loyal members, and held during the rebellion, until the present reorganization was effected, on the first Monday in August, 1865, by the election of the following named gentlemen as officers: Lieutenant C. W. Merryhew, Waterloo, President; Judge B. P. Hannan, Luray, Vice President; Judge J. T. Caldwell, Athens, Treasurer; O. F. Ensign, Esq., Ashton, Secretary; and the following named gentlemen as a Board of Directors: Captain T. W. Arnold, Winchester; Judge Edward Anderson, Fairmount; Charles Harr, Esq., Athens; Colonel C. S. Callahan, Union; G. W. Hecock, Esq., St. Francisville; William W. Johnson, Esq., Kahokia; A. Wheeler, Esq., Winchester; A. Bechtol, Esq., Waterloo; L. B. Hume, Esq., Union. Chief Marshal, J. H. Taylor,

Esq., Athens; Assistant Marshal, R. M. Haywood, Esq., St. Francisville. The subjoined is the premium list of the eighth annual fair, held at Waterloo, Clarke county, Missouri, on the fifth, sixth and seventh days of October, 1865:

PREMIUM LIST.

ARTICLES OFFERED.	BY WHOM.	PREMIUM.
Class "A," Cattle.		
Best blood cow	Joseph McCoy, Jr.	$5 00
Second best blooded heifer calf	Joseph McCoy, Jr.	3 00
No. 3, Milch Cows and Oxen.		
Best yoke of oxen	Joseph McCoy, Jr.	4 00
Third best milch cow	Leo. McCoy	1 00
Class "B," No. 4, Roadsters.		
Best aged stallion	Abram Sortore	5 00
Second best aged stallion	Samuel Beard	3 00
Third best aged stallion	Jacob H. Gates	1 00
Best three year old stallion	Thomas A. Rosebury	5 00
Best two year old horse colt	D. F. Hull	2 00
Second best two year old horse colt	Alfred Pope	1 00
Best yearling horse colt	Clay Sites	3 00
Best horse colt under one year	James Fightmaster	3 00
Best brood mare, colt by side	H. C. Montgomery	3 00
Best three year old filly	R. A. McKee	4 00
Best two year old filly	G. W. Hecock	4 00
Second best two year old filly	J. T. Caldwell	2 00
Third best two year old filly	H. H. Sanford	1 00
Second best filly colt	George McKee	3 00
Third best filly colt	C. O. Sanford	1 00
Best pair match buggy horses	W. H. Sowers	5 00
Second best pair match buggy horses	J. C. Harkness	3 00
Best single buggy horse	A. B. Newbury	4 00
Second best single buggy horse	L. S. Cherry	2 00
Best saddle animal	R. A. McKee	3 00
Second best saddle animal	A. Pantridge	2 00
No. 5, Farm Horses.		
Best aged stallion	Philander Sweet	5 00
Second best aged stallion	George Weise	3 00
Best three year old stallion	D. S. Miles	5 00
Best three year old filly	L. P. Riley	4 00
Best pair draft horses	A. Pantridge	4 00
Best horse colt, under one year	F. Frost	2 00
Class "C," No. 6, Mules and Asses.		
Best jack (Hannibal)	J. N. Lewis	5 00
Second best jack	J. T. Caldwell	3 00
Best jennet (Missouri Belle)	J. N. Lewis	5 00
Second best jennet	J. T. Caldwell	3 00
Third best jennet (colt Pocahontas)	J. N. Lewis	1 00
Best three year old mule	J. N. Lewis	2 00
Best mule under one year old	George Shotwell	2 00
Second best mule under one year old	Jacob G. East	1 00
Class "D," No. 7, Sheep.		
Best Spanish merino buck	George Remley	3 00
Class "E," No. 8, Hogs.		
Best boar under one year old	A. Bechtol	2 00
Best pigs	Aaron Bechtol	2 00
Class "F," No. 9, Poultry.		
Best pair ducks	Mrs. J. T. Caldwell	1 00
Best pair turkeys	Mrs. J. T. Caldwell	1 00
Class "G," No. 10, Agricultural Products.		
Best bushel Irish potatoes	J. T. Caldwell	2 00
Best bushel sweet potatoes	A. Bechtol	1 00
Best half dozen turnips	J. T. Caldwell	1 00

PREMIUM LIST—CONTINUED.

ARTICLES OFFERED.	BY WHOM.	PREMIUM.
Best half dozen rutabagas	J. T. Caldwell	$1 00
Best five ears seed corn	J. Harrold	1 00
Best one-fourth bushel fall wheat	H. J. King	1 00
Best one-fourth bushel timothy seed	H. J. King	1 00
Class "H," No. 11, Fruits.		
Best dozen pears	Harvey Loomis	1 00
Class "I," No. 12, Household Manufacture.		
Best pair wool socks	Mrs. S. J. Sullivan	1 00
Best piece wool carpet	Mrs. A. Bechtol	2 00
Best made shirt	Miss F. Thorpe	2 00
Best made vest	Mrs. S. J. Sullivan	2 00
No. 13, Pantry Stores.		
Best jar pickles	Mrs. A. Bechtol	1 00
Best jar peach preserves	Mrs. M. Weaver	1 00
Best jar plum preserves	Mrs. M. Weaver	1 00
Class "J," No. 14, Domestic Manufacture.		
Best two horse wagon harness	H. Swasey	4 00
Best gentleman's saddle	H. Swasey	2 00
Best bridle	H. Swasey	1 00
Best gallon sorghum molasses	Dr. A. Clarke	2 00
Class "L," No. 16, Miscellaneous.		
Best lady equestrian	Miss Sarah Meryhew	5 00
Second best lady equestrian	Miss M. J. Harr	2 00
Third best lady equestrian	Miss S. R. Harr	2 00
Fourth best lady equestrian	Miss L. Frazee	2 00
Best pacing under saddle, time 3-45	Col. H. M. Miller	6 00
Best trotting in harness, time 3-15	L. S. Cherry	5 00
Second best trotting in harness, time 3-26	W. W. Allen	2 00

The society held a fair at their grounds, at Waterloo, on the 5th, 6th and 7th days of October, 1865. The weather was all that could have been desired; the attendance and exhibition exceeded the most sanguine expectations of every one, and gave a sufficient guarantee for the future success of the Clarke County Agricultural Society. The premiums offered were not so large as formerly, or as will be offered hereafter, the time being too short to make proper preparation. The announcement was made more for the purpose of enlisting the efforts of our citizens in a permanent reorganization of the society. The success was unexpectedly large, the receipts paying all indebtedness, paying all premiums, dollar for dollar, and leaving a surplus of funds in the treasury, to be expended in repairing and beautifying the grounds for the next annual meeting of the society. Taken as a whole, the success of the eighth annual fair speaks volumes for the sagacity, enterprise and indefatigable energy displayed by the officers and directors. After four years of cruel war, without a meeting of the society in the interim, the citizens were brought together *en masse*. A more pleasant reunion could not have been devised. There were the battle-scarred veterans who had borne the brunt of battle on many hotly contested fields. There were the old and young, the grave and the gay, the quondam rebel and the brave and fearless unionist, burying old feuds and party differences, mingling together as

of yore, collected together from our own and surrounding counties and from our sister States. The ladies (God bless them) contributed their bright presence and cheering smiles to beautify and enliven the scene.

The number of acres under cultivation in the county is seventy-three thousand one hundred and ninety-five (73,195). The number of acres unimproved is one hundred and twelve thousand nine hundred and thirty-nine (112,939). The principal products are wheat, corn, rye, oats, barley, buckwheat, potatoes, cabbage, onions, sorghum, hemp, flax, cotton, tobacco, timothy, blue grass, Hungarian grass, clover, red top, millet, brown corn, beans and castor beans.

WHEAT. The average yield of wheat per acre among our best farmers is about twenty-five (25) bushels. (This year cannot be accounted an average year, from the fact that all the wheat was more or less injured by cold and dry weather.) The average to the county is about fifteen (15) bushels per acre. Fall wheat is most cultivated in the county. Sub-soil plowing has been tried experimentally, with different degrees of success. In our opinion the most beneficial results are to be obtained from sub-soil plowing in the months of August and September. There is no appreciable difference in plowing six (6) inches deep and sub-soiling ten (10) inches for corn, that we have been able to discover. In the wheat crop it makes full fifty (50) per cent. difference. Our theory on this point is: the surface sod being turned under to a depth of ten (10) inches, it retains the moisture, and during the process of disintegration evolves more heat than when turned under the ordinary depth of four (4) to six (6) inches. In sub-soiling for wheat the weeds are turned under to such a depth that the seeds, owing to the super-abundant moisture, necessarily rot, while, on the contrary, when turned under four (4) inches they retain their vitality, germinate, and as a necessary sequence outstrip the grain. Wheat on sub-soiled ground will average fifty (50) per cent. better either in drouth, excessively wet, or freezing weather. It makes a difference of eight (8) to twelve (12) inches in the height, and makes a larger and plumper grain. In our opinion sub-soiling should be extensively resorted to by our farmers, putting the first crop in fall wheat; after that the land is greatly benefitted for oats, corn or any other cereal. The material benefits of sub-soiling endure about four (4) years, when it should be repeated. Drills have not obtained largely in this county, but have given entire satisfaction so far as used. Owing to the depth with which they put in the grain, it is less liable to freeze out than when sown broadcast. We have a theory concerning the planting and propagation of wheat, which we deem of great importance, and shall take occasion to give it here in *extenso*. Put the wheat in with a drill, running it north and south, leaving the ground smartly ridged. If drilling is inadmissible, sow broadcast and plow in with a small diamond or double shovel, always running north and south. This county being exposed to freezing and thawing, with heavy winds prevailing from

the north and northwest, blowing the light and dry snow into drifts, exposing the surface ground, which, if rolled flat, soon dries and is blown away in dust, exposing the tender roots of the young wheat, and endangering the entire crop. Whereas, when the ground is properly ridged north and south, the snow fills the interstices between the ridges, affording protection to the roots, while in seasons when there is no snow on the ground the action of the sun's rays is most beneficially concentrated upon the ridges during the process of thawing and subsequent freezing, by gently dissolving the ridges and clods, which gradually settle down upon the grain, giving protection, vitality and strength at the same time to the roots. We have found this theory to be correct, and urgently recommend it to the consideration of all intelligent farmers. We would recommend the use of the drill in putting in all kinds of small grain. So far as under-draining has been employed, it has proven a valuable adjunct to farming interests, and we would earnestly recommend a further and more extensive employment of it.

In arriving at an aggregate of the wheat crop in the county, it may not be amiss to state here, that the breadth of land sown is not so great as prior to the rebellion, owing to the many changes that have occurred and the paucity of laborers. The approximate aggregate for 1865 is twenty-five thousand (25,000) bushels for the county. The aggregate in 1860 was thirty thousand seven hundred and eighty-six (30,786) bushels, according to the census return.

CORN. The average yield of corn per acre among the best farmers is about sixty-five (65) bushels. The average yield per acre in the county is about forty-five (45) bushels. We have the following varieties: Yellow gourd seed, yellow smooth (known as the yellow Strawn, taking its name from the great stock raiser of Sangamon county, Illinois, Jacob Strawn,) yellow Galena, white shoe-peg, white gourd seed, white smooth, commonly called mill corn, the eight-rowed squaw corn. We have two or three varieties of white flint corn, also, for early roasting ears, the evergreen, Queen Isabella and the white six weeks corn. The best variety for stock is considered to be the yellow Strawn. It is usually fed from the shock on the stalk. In some instances it is fed in the ear, and at other times ground and fed. In our opinion the most beneficial mode of feeding is to crush it, cob and all, make into mush and feed to cattle and hogs. It is marketed through stock and shipped in bulk.

The approximate aggregate raised in the county for 1865 is nine hundred and ninety-six thousand, six hundred and sixty (996,660) bushels; being fully up to the census return for 1860, and in our opinion would have exceeded those figures but for the lack of necessary help.

RYE. The average yield of rye per acre, among the best farmers, is about twenty-five (25) bushels. The average yield per acre in the county is about seventeen and one-half (17½) bushels. The yield would have been larger, but the entire crop was injured by frost on the night

of the sixth (6th) of May. Rye is ordinarily a sure crop in this county, and our general average is from twenty-five (25) to thirty (30) bushels. We have two varieties of rye, known as the black and white. The black rye is considered best for stock, being possessed of stronger nutritious qualities than the white. The white rye makes a fair article of flour, and is much used for culinary purposes. The black is usually fed in chopped feed to mules and horses, and slopped for horses and cows. It is marketed in bulk.

The approximate aggregate of rye raised in the county is ten thousand six hundred and forty-eight (10,648) bushels, being fully up to the census return for 1860.

OATS. The average yield of oats per acre, among the best farmers, is about fifty (50) bushels. The average per acre in the county is about forty (40) bushels. We have three varieties, denominated white and black oats, and the Irish one sided oat. The black oat is much the heaviest grain, and is by far the best feed for stock. It is usually fed in the sheaf, chopped and mixed with the ground rye or shelled and fed. Oats are marketed through stock and in bulk.

The census report for the year 1860 makes a return of a fraction over sixteen thousand (16,000) bushels produced in the county, which is evidently a mistake. Our approximate aggregate raised in the county in 1865 is not less than two hundred and fifty thousand (250,000) bushels. A comparison of the figures for the years of 1860 and 1865 instantly suggests to the mind a grievous error in the returns from the census bureau.

BARLEY. The average yield of barley per acre, among our best farmers, is twenty (20) bushels. The average yield of barley per acre in the county is fifteen (15) bushels. We have two varieties of this grain, viz: spring and fall barley; both are bearded. The spring barley is considered the best variety for this section of country. Barley is not used here as food for stock. It is marketed in bulk for malt.

The approximate aggregate raised in the county is one thousand (1,000) bushels.

BUCKWHEAT. The average yield of buckwheat per acre, among our best farmers, is about thirty (30) bushels. The average yield of buckwheat per acre in the county is about twenty-five (25) bushels. We have but one (1) variety, denominated black buckwheat. We do not feed this grain to stock. Buckwheat is marketed in flour and shipped in bulk.

The approximate aggregate raised in the county in 1865 is five thousand four hundred and eighty-three (5,483) bushels. The great and increasing demand for this staple flour renders the production of buckwheat an important item to the farming community.

SWEET POTATOES. The average yield of sweet potatoes per acre, among our best farmers, is about two hundred and fifty (250) bushels. The average yield per acre in the county is about two hundred (200)

bushels. We possess two varieties of this esculent, with three sub-varieties each. They are the red, yellow and white yam potato, and the red, yellow and white long potato. We do not feed them to stock, but use them largely for culinary purposes. They are shipped to market in bulk. The approximate aggregate raised in the county is two thousand five hundred (2,500) bushels.

IRISH POTATOES. The average yield of Irish potatoes per acre, among our best farmers, is about two hundred and fifty (250) bushels. The average yield per acre in the county is about one hundred (100) bushels. We have six (6) varieties of the Irish potato, to wit: The buckeye, peach blow, Neshannock, pink eye, Hobart Town and Hopkins' red. We consider the best variety to be the buckeye; second best, the peach blow; and, third best, the Neshannock. The best variety for stock feeding is the Hopkins' red. The best mode of feeding them is as follows: Boil thoroughly, mash well and mix with corn meal, then feed to hogs and cattle. Potatoes are shipped to market in bulk.

Our approximate aggregate for 1865, raised in the county, is fifty thousand (50,000) bushels, being nearly double the number of bushels raised in the year 1860, according to the census return.

In the year 1863, the long striped potato bug disappeared from this section of country, and was succeeded in 1864, and this year again, by a round striped bug, that would have totally destroyed the potato crop had they not been picked from the vines. We tried several methods of driving them off, but met with no success, until we hit upon a solution of our own discovery, which did the work effectually. We will take this occasion to give the manner of preparing the solution, and recommend it to potato producers as a *sine qua non* in the work of ridding themselves of those intolerable pests, potato bugs. Take brine, sufficiently strong to bear an egg, then add to each gallon of brine one-half an ounce of hyd. sub. mur. (calomel,) mix well and pour over the vines with a sprinkler, in the evening. The bug is most active in committing its depredations in the evening and morning. A single application will frequently effectually squelch them.

SORGHUM. In order to arrive at a proper estimate of the amount of sorghum raised and manufactured in this county, it will be necessary to make some general remarks concerning the different varieties of cane cultivated, one of which is sorghum, while the others are not. We have the Chinese sorghum proper, the Chinese imphee and the African imphee. The sorghum is more extensively cultivated than either of the other varieties. It grows to a greater height, is more vigorous and is thought to contain more sap than the imphees. It matures somewhat later, but yields more syrup than the other cane. It is conceded that the sorghum forms a lighter, more pleasant and palatable syrup than the imphees. It should be allowed to mature fully, in all cases, before cutting, and be worked up immediately, as it deteriorates materially after gathering. In our opinion, the sorghum

is better adapted to our necessities than the imphees. It is a larger cane, more hardy, better bladed and less liable to be injured by frost, the blades acting as a shield against its ravages in a great measure. We would respectfully recommend the importation of pure seed every three years, as, from our observation, the cane here deteriorates and affiliates with our broom corn, rendering it almost useless for manufacturing purposes. The yield of syrup per acre will average about one hundred and fifty (150) gallons, with ordinary attention. The yield of seed is about forty (40) bushels per acre, being, in our opinion, equivalent to the same number of bushels of corn, as food for stock and poultry. We would not recommend the blades as food for stock, deeming it, in our opinion, unfit for that purpose. It is at least double as hard on land as the imphees, owing to its vigorous growth and prolific suckering, which latter peculiarity is not observable in the other canes. The amount of syrup now manufactured is sufficient for home consumption. Chinese imphee is a light growth cane, averaging about seven (7) feet in height, small stalk, entirely free from suckers, is very easy upon land, and matures earlier than the sorghum. It, however, does not yield more than one-half as much syrup to the acre. It is not cultivated to more than one-tenth the extent of sorghum, a few persons preferring this species of syrup, which possess a taste slightly similar to chloride of sodium (salt,) *de gustibus non est disputandem.* The yield of seed is about twenty (20) bushels per acre. This variety of cane is not so liable to degenerate as either of the others, but, in our opinion, should be imported and renewed every five (5) years. African imphee: This is another variety of cane cultivated in this section of country, and is an intermediate between the sorghum and Chinese imphee. It grows to an average height of nine (9) feet. It is propagated to a small extent only, being a favorite with a few persons. It makes a syrup possessed of distinctive qualities from that procured from other canes. The yield of seed is about thirty (30) bushels per acre. This variety degenerates about every third year, and if it is designed to keep it up, the seed should be imported pure. The yield of syrup is a little in advance of the Chinese imphee, but will not compare with the sorghum. The heaviest yield of cane per acre is produced by our light, loamy, bottom soil, while the better qualities of upland and prairie produce almost as well. There is no perceptible difference in the syrup produced from bottom, prairie or upland.

As regards the manufacture of sugar from the different canes, we would state, there has come under our notice but one successful attempt. Mr. William R. Colgan, of Athens, in this county, has manufactured three samples by a patent process, one sample from each variety of cane enumerated. From the sorghum syrup, when secured from properly matured cane, he states a result of five (5) pounds of sugar from one (1) gallon of syrup. The imphee syrups produced each about three (3) pounds of sugar from one (1) gallon of syrup.

There was a residue of syrup left from each variety of cane, of an improved quality. The appearance of the sugar from sorghum is excellent, the grain being coarse, firm and presenting a polished surface. In coffee, there is no perceptible difference from the best Orleans sugar, though in tea, we could discover the inevitable sorghum taste. The imphee samples were both good, being lighter colored than the sorghum, though the grain was not so clearly defined. It is our opinion, that by Mr. Colgan's patent the total amount of sugar required for home consumption can be manufactured in the county and State. We would earnestly recommend it to the attention of the farming community throughout the State, and take this opportunity to advise them that they can obtain the right to manufacture under the patent, and all necessary information pertaining thereto, by addressing or applying in person to William R. Colgan, Esq., Athens, Clarke county, Missouri.

The implements used in the manufacture of sorghum are the wooden crusher or mill and several patent iron mills, the best of which is manufactured by S. S. Vail & Co., Keokuk, Iowa, one and two horse. The best boiling implement used is Cook's patent evaporator, making a better and more uniform syrup than any other. There are numerous modes of boiling throughout the county, too tedious to enumerate, each vicinity possessing something peculiar to itself. For the sake of brevity, we merely mention the best.

The aggregate produced in the county in 1860 was nine thousand two hundred and ninety-nine (9,299) gallons. For 1865 we estimate thirty-seven thousand two hundred (37,200) gallons.

HEMP is cultivated to some extent, though not so much as formerly, owing to the fact that labor cannot be obtained to work it up; the class of white laborers finding other work more congenial, and paying better. Hemp is raised entirely on the bottom land. There is a large amount of good hemp land in the county, and, so far as grown, it has done well, linting finely. We have no factory in the county.

The average yield per acre is from ten (10) to fifteen hundred (1,500) pounds. In our opinion, the production of this staple should be materially increased. Our approximate aggregate raised in the county in 1865 is six tons.

FLAX is cultivated to quite an extent in this county, both for the seed and fibre. The fibre is principally manufactured in the county, for home consumption. Our farmers have turned their attention greatly to the production of flax-seed for shipment. The average yield of seed per acre is about twelve (12) bushels. The yield of lint per acre, from the brake, is about eight hundred (800) pounds, losing about fifty (50) per cent. in cleaning. Within a few years, owing to the high price of cotton fabrics, almost every farmer's household has become a factory on a small scale.

The census return for 1860 records a total production in the county of only three hundred and sixty-three (363) pounds of flax and eighteen

(18) bushels of seed. Our estimated aggregate for 1865 is three thousand (3,000) pounds of fibre and twelve hundred (1,200) bushels of seed.

COTTON has been produced to a limited extent in this county. Owing to the high latitude in which we are geographically located, it has not been sufficiently tested on a large scale to enable us to form a correct opinion as to whether it can or cannot be grown here as a staple. There has been grown in the last five years, in the vicinity of Athens, a fourth(¼) of an acre each year, raised by a family for their own use, and disposing of any surplus in the immediate neighborhood. It is planted in indifferent white and red oak land, and, last year, produced at the rate of five hundred (500) pounds per acre, about one-half the bolls opening being of excellent quality; the remainder of the bolls were opened by hand, producing an inferior quality of cotton. The prospects this year, on the same piece of land, are more flattering than heretofore. The height of the plants will average from two and one-half (2½) to four (4) feet. There are other small patches in this vicinity that look well and grow to a similar height. From the experiments coming under our observation, we think it expedient at this time, in consideration of the extremely high price of this staple, to advise every farmer to raise a patch of cotton, as a measure of practical economy. It will bear planting earlier, and consequently mature at a corresponding earlier period, and produce better at the same time, on our light, loamy, sandy bottom soil. In this locality, on bottom land, it is more secure from frost, owing to the fogs and moisture rising from the water. There are bodies of bottom land bordering on the Des Moines river below Athens and St. Francisville, that, in our opinion, could be devoted very profitably to the production of cotton.

TOBACCO is grown in this county for market, though not to so great an extent as prior to the rebellion. Since the establishment of peace, however, under the stimulating influences of ruling high rates, the attention of producers has again been turned to the propagation of this staple. The land best adapted to the culture of tobacco is new white oak and hickory, rich and fertile, with red clay sub-soil. Our dry bottom lands also produce an excellent tobacco. The prairie upland produces a lighter quality, but the prevalence of storms and high winds operates strongly against its successful propagation in these localities. An essential requisite to the successful growing of this staple is a location properly sheltered from gales, high winds, *et id omne genus*. But two crops should be grown in succession on the same ground. It should then be seeded down in small grain.

The amount of tobacco produced in the county in 1860, according to the census return, was ten thousand two hundred and seventy-five (10,275) pounds. We approximate the aggregate of the county for 1865 at twenty thousand (20,000) pounds. It is produced for home consumption by almost every farmer in the county.

The time for sowing the seed, in this latitude, is the latter part of

February and first of March, upon a hillside with a southern exposure. The manner of preparing seed beds, propagating from seed, transplanting, culture, etc., etc., will be given. If on new soil, the bed should be prepared by burning brush upon it; if on old soil, by the admixture of well prepared compost, in addition. The seed beds should be long and narrow, in order that they may easily be kept free from weeds. The soil is to be thoroughly pulverized. The seed should be mixed with dry plaster or ashes, and sown broadcast. A tablespoonful of seed is sufficient for a square rod. It should not be covered, but the bed should be rolled or pressed with a board or with the hoe, and should be kept moist. The utmost care should be observed to prevent the weeds from growing among the young plants, whose growth should be urged forward as rapidly as possible. They should stand in the seed bed from half ($\frac{1}{2}$) an inch to one (1) inch apart. Great care must be taken to guard them from the late frosts of spring. They are liable to be attacked, in an early stage of their growth, by a small white fly, which injures, if it does not destroy them. On this account their growth should be stimulated by the application of ashes, soot, plaster or guano, and they will soon get beyond its ravages. They should also be watered in dry weather from a common sprinkler. In about two months they will have attained a height of three (3) inches, and be large enough to be transplanted. Much discernment and good judgment are necessary to determine when the crop is sufficiently mature for harvesting. When ripe it turns spotted, and the color of the lower leaves changes to a brown. It is essential that the plants be housed before the first frost. The whole crop will not be ripe at the same time, and it will be necessary to pass through the field, selecting such plants only as appear to be ripe. They are cut with a knife, similar to that used for cutting corn stalks, and are laid upon the ground for a few hours to wilt, but must not be long exposed to a hot sun. They are then removed to the tobacco house, and hung up by pegs driven into the stalk by a mallet, about four inches from the largest end of the stalk, or by tying the ends of the stalks to poles which are laid on beams or joists, as near to each other as possible, and still permit a free circulation of air. If hung too closely, they are injured while in a green state. By some planters the drying is hastened by a gentle fire underneath, but, generally, reliance is placed upon the air, which is freely admitted in dry weather, but is excluded in damp. Many planters think it best to commence the harvest when the majority of the plants are ripe, and then take them clean in the cutting. They think the scattering plants are more liable to injury from wind and rain. Good planters doubtless differ on many points in the culture of tobacco, and those who engage in the business must profit from their own observation and experience. The size of the tobacco shed should vary with the extent of the crop which it is proposed to cultivate. Its height may be such as to receive several tiers of plants when suspended on the poles. These poles should be placed

five (5) feet apart. A free ventilation should be secured from the sides of the building, by having the boards placed vertically, and every third board hung on hinges. The building should also admit air from beneath. It should have a tight roof, on which there should be a ventilator constructed, with slats in the form of Venetian blinds. The main principle to be secured is a free and perfect ventilation, which shall carry off the moisture of the plants as fast as possible. During the prevalence of cold, drying winds, the ventilators on the windward side should be closed, and in very damp weather they should all be closed. A building thirty-five (35) feet long, twenty-four (24) feet wide and fifteen (15) feet high will receive three tiers of plants, and will store the tobacco grown on an acre. When the plant is fully cured, which may be known by the stem of the leaf becoming free from the sap, it is to be stripped from the stalks. A damp day should be selected, so that the leaves may not crack and waste. It is essential that they be pliant. As it is stripped from the stalk, it is assorted into different qualities according to the uses to which it is to be applied in manufacturing. The broad leaf, which is suited to form wrappers for cigars, must be laid carefully to itself. A sufficient number of leaves are tied together to form what is termed a hand, and the leaves are bent over forming a head, around which a wrapper is wound and tied. These are laid in piles, the bent end outward, and, after remaining a few days, they are ready to pack. In Virginia and Maryland, tobacco is packed in hogsheads; in Connecticut, in boxes. Heavy pressure is used, by which the tobacco is pressed into a hard mass, so that a hogshead contains from seven hundred and fifty (750) to nine hundred (900) pounds. In this condition it is shipped and sent to market.

We recapitulate several points on which experienced producers strongly insist, because they express conditions of success in cultivating tobacco.

1. The land must be in good condition, well enriched with manure; it must be plowed in the fall and again in the spring, and be thoroughly pulverized.

2. The plants in the seed bed must be carefully weeded and guarded against the fly, and so thinned out as to acquire a hardy growth before being transplanted.

3. During the season for ravages of the worm, the plants must be examined twice each day, for the purpose of destroying them.

4. In curing, the leaf stalk must become perfectly freed from moisture.

5. We add: Farmers who are commencing the culture of tobacco, should avail themselves of the services of an experienced man, who can supply that knowledge which cannot be learned from books. It may be proper to say a word in regard to the profit of the crop. In the first place, if the crop is grown on one field but for a single season, it leaves the land in good condition for any crop the next year.

It is highly manured and free from weeds. It may be followed by wheat and then by grass, and by this rotation, remunerative crops may be secured without exhausting the soil. The worn-out fields in some of the tobacco growing States should be monitory to cultivators, and teach them one of the most important lessons of modern tillage, viz: the necessity of a proper rotation of crops. There are different varieties of the weed propagated here, with different degrees of success. The Maryland broad leaf is the most productive, being heavier, with broader leaf, stronger stem, less liable to be injured by wind, and producing more nicotine, or the active principle of tobacco. It is preferred by manufacturers and consumers for chewing. It is topped at twelve (12) leaves. It will average, with proper cultivation, fifteen hundred (1,500) pounds per acre. The Roanoke comes second on our list. This variety attains a greater height than the Maryland broad leaf, and is more liable to injury from wind than the former. It is principally manufactured for chewing. It should be topped at fifteen (15) or sixteen (16) leaves. The average production per acre is from one thousand (1,000) to eleven hundred (1,100) pounds. We have a third variety, called the Cuba or Habana leaf, used entirely for manufacturing cigars. It is topped at twenty (20) to twenty-two (22) leaves, yielding an average of about eight hundred (800) pounds per acre. The wind has no effect upon this variety, owing to the narrowness of the leaf and stiffness of the stem. We have experimented to some extent with some seed recently imported from the Japanese Empire, and are highly pleased with our success. This tobacco appears to be an intermediate between the Roanoke and the Cuba or Habana leaf. It grows to a topping height of sixteen (16) or seventeen (17) leaves, growing two leaves to one of any other kind on the stalk. It is an excellent smoking tobacco, and used only for cigars. Experienced tobacconists express the opinion that it will ultimately totally supersede the Cuba or Habana leaf in this country. It produces about an average of one thousand (1,000) pounds per acre. The seed was imported during the winter of 1863-4. So far as our experience is concerned, the Cuba or Habana leaf is the only tobacco that deteriorates. It should be renewed every three years. All tobaccos are impoverishing to land in a greater or less degree. The land, however, can be strengthened and kept up by changing crops, employing manures, and with the aid of fertilizers.

SHEEP. The amount of wool produced in this county in 1860 was nineteen thousand four hundred and twenty-three (19,423) pounds, according to the census return. We approximate the aggregate for 1865 at fifty-eight thousand two hundred and seventy-five (58,275) pounds. The total number of sheep in the county in 1860 was seven thousand three hundred and seventy-nine (7,379), according to the census return. We approximate the aggregate number for 1865 at twenty-two thousand one hundred and fifty (22,150). Sheep, wool and cloth have each increased materially in price since the rebellion,

causing a greater demand. Our farmers, in consequence of its advance, have been greatly stimulated in the propagation of sheep, the production of wool and the manufacture of cloth. We have six (6) different varieties of sheep, viz: Spanish merino, French merino, Southdown, Bakewell, Cotswold, and our native breed, called mongrels. We will proceed to speak of each variety separately.

1st. *Spanish Merino.* There are but few of this class of sheep in the county, having but recently been introduced. They clip from six and one-half (6½) to nine and one half (9½) pounds of wool (unwashed). They are about the size of our mongrel breed, averaging about one hundred and twenty (120) pounds gross. It is not adapted to this climate, the wool parting in creases or folds, and growing from the hoof up, permits the cold rains, sleets, snows and piercing winds to drive immediately to the skin, chilling and contracting them almost to perishing. The moisture adheres to the locks on the limbs, and freezes, impeding the action of the animal and prevents free motion in traveling. The lambs are usually very weak, and so thinly covered that the cold spring rains and winds act very unfavorably upon them. These sheep are too tender for our climate, require too much housing and attention during winter, and do not, as a general thing, remunerate for the trouble expended, in the same ratio as our own mongrel breed.

2d. *French Merino.* This breed of sheep are smaller than the Spanish merino; clip less, though of finer quality; are not as good for mutton; troubled the same by weather, except the traveling impediments; their lambs are equally as weak, tender and troublesome in rearing; they are too tender for our climate, not so healthy as the Spanish merino, and are not very extensively patronized here.

3d. *Southdown.* These sheep have lately been introduced, and are fast rising into note. We think them very well adapted to this climate. They are larger, hardier and healthier than either of the merino breeds, and are much better adapted to our necessities for both mutton and wool. As they are a very desirable sheep, we will give a more extended description of them. The Southdown has a small head, without horns, a long, gray or brown face, thin lips and under jaw, woolly ears and forehead, and a full and bright eye; a neck thin near the head and widening into graceful symmetry as it joins the shoulders; a deep, wide breast, projecting forward; the shoulders not too wide above, bowing outward from the top to the breast; the back flat from shoulder to tail; the ribs extending horizontally and backwards, and then curving down barrelwise; the loin and rump broad; the hips wide; the tail set high; the belly straight like the back; the legs of medium length, and a dark color; the fore legs straight, standing far apart; the hock turning slightly outwards; the twist very full, the bone fine; the wool short, curled and fine, and destitute of fibrous spire that give the felting properties of wools. As prolific breeders, the Down family is unsurpassed, and scarcely equaled by any other

breeds. Their English reputation in this respect is fully reasserted in this country. Their hardiness enables them to live through our severe storms and harsh winds, on the leeward side of a haystack, and amid a Western farmer's wilderness of wheat straw, and out on the unprotected prairie. Of the mutton it is needless to write. It is everywhere regarded as an already attained ideal of perfection in that wholesome and nutritious meat. The flavor is delicate, the flesh juicy, the fat well intermixed, and its excess laid on internally. They are regarded as the best breed for use "as a working flock," so prolific, so healthy in large flocks, so useful in folding for manure, and so easily fed upon elevated situations and the natural pastures of dry uplands. Above all, they are invaluable for crossing with Cotswolds for early lambs, and also our natives.

4th. *Bakewell* is a large, healthy sheep, producing a long wool, rather coarse, suitable for blankets, is as large as the Southdown, makes excellent mutton, and is well adapted to our climate.

5th. *Cotswold.* There are but few of this variety of sheep in our county, and these have been but recently introduced. They should be propagated largely, being exceedingly valuable for mutton and for crossing; they are, moreover, the largest sheep in the country. They are possessed of a good figure and have a portly gait. The wool is of moderate fineness, long white and strong; they have a long, thin head, well set on, broad chest, well rounded barrel and straight back. They are now extensively used for crossing with other sheep, to obtain early lambs for market, both in this and the mother country, and are rising rapidly in public estimation for this purpose. For rich pastures in regions where grain is abundant and cheap, they are invaluable, and especially to be preferred in view of the roughness and negligence characterizing the American system, or rather want of system, of sheep husbandry.

6th. *Mongrels or Natives.* This class of sheep is numerous, having been in the county since its earliest settlement. They are a large and healthy breed, well adapted to our climate. They clip a medum quality of wool, well adapted to the manufacture of jeans, satinets, blankets, etc., etc. They possess excellent breeding qualities and furnish an excellent mutton. In the main they may be called a good class of sheep, and can be and will be much improved. In our opinion, the best varieties for our climate are the Southdown, Bakewell, Cotswold and our mongrels, being hardy, large, healthy, productive and enduring the cold, bleak winds and storms of our level prairies. The merinos will answer tolerable in well sheltered localities.

A few words in regard to lamb raising. We regard the Southdown, Bakewell, Cotswold and our mongrels as the most prolific, and producing the hardiest young of any varieties of sheep we possess. The merino lambs are too tender and require too much attention. The bucks should be separated from the flocks the latter part of July, and not allowed to mingle with them until the first of November. Our

early spring months are too bleak, wet and cold for the safe propagation of early lambs. They should not be allowed to make their appearance earlier than the latter part of March, on to the twentieth (20th) of April.

There are quite a large number of flocks in the county. Among the farmers owning them, we give the following list, viz: John Schee, J. T. Caldwell, Charles Harr, Isreal Duty and T. J. Calvert, all residing in the vicinity of Athens; John Folker, John Bolter and Charles French, residing near Acasto; Peter Conkle and J. N. Lewis, residing near Chambersburgh; Mr. Butler & Son and Frank Howell, residing near Luray; Dr. A. Clark and William W. Johnson, residing near Kahokia; Mr. George Remley and R. A. McKee, residing near St. Francisville, and other large flocks near Winchester and Fairmount, but we are unable to name the owners.

The advantages for pasturage are good, principally prairie and timber, fast becoming set with blue grass. There is a large scope of land in the county adapted to sheep raising, the high, rolling sections being best for this purpose, as they are dryer and cleaner than the more level prairie.

From an experience of twenty years, we may state here we have never known a disease prevalent among sheep in this county, until July of the present year. An epidemic broke out among the flocks, similar in its action to the hog cholera. It passed through the entire flocks, without fatal consequences, however, except among the lambs. Here the mortality will average fully three-fourths. We deem it important that the lambs should be separated from the ewes upon the first appearance of the disease in the flock, and kept apart until it subsides. They imbibe the disease through the mother's milk; hence, the necessity for separation. "An ounce of prevention is worth a pound of cure," says an old maxim, and our experience with this disease fully demonstrates the truthfulness of the saying. We tried every remedy that could be devised, without success, until we discovered, in the course of our experiments, one that did the work effectually. We give it here for the benefit of all parties concerned. Mix one part of *soda bicarb.* with eight parts of *chloride sodium* (salt); give same as usual manner of salting, every other day for a week. Afterward, twice a week until the disappearance of the disease. Simultaneous with this remedy, take a strong solution of assafœtida, put a little in the mouth, and smear the nose, face and head of each sheep. There is a peculiar odor arising from the flock during the prevalence of the disease. The sheep appear to be feverish and thirsting for water frequently. It is necessary to change pasture every few days. They should be allowed to resort to water *ad libitum* until the epidemic subsides.

So far as our experience with imported fine-wool sheep will enable us to judge, we would state that it does deteriorate and grow coarser.

There are losses in every sheep fold in the county from the ravages

of dogs, as there always has been and always will be in counties so intolerably overrun with canine pests as ours. We deem it a duty incumbent upon our able law-makers, and earnestly invite their attention to the necessity of legislating in this important matter, allowing not more than one canine quadruped to each family in the State. The passage of such a law would cause rejoicing among the whole sheep-raising fraternity, and they would rise up and exclaim, as one man, in the classic language of Salathiel, the wandering Jew, "bully for you!"

Prior to the rebellion, those ancient commodities prevalent in every well regulated farm house, commonly denominated spinning wheels and hand looms, had grown obsolete. The whiz and whirr of jacks, reels, condensers, etc., with the crash and bang of power looms, were almost unknown in our county. Now the scene shifts—the curtain rises. In every house, almost, is heard the soft hum of the wheel, the noise and commotion of the shuttle, reed and treadles. Go to our only factory, and all is activity and bustle. The wool goes in at one end and cloth comes out at the other, and with the limited facilities for manufacture at our command, the supply does not equal the demand for home consumption. Our merchants are compelled to purchase from other manufacturers, we frequently receiving invoices from Indiana, Ohio, and even further east. With our almost unequaled facilities for sheep growing, our inexhaustible water power for manufacturing, we are compelled to buy from other markets, simply for lack of necessary machinery, to supply the home demand. We earnestly present these facts to men of capital, with the hope that some practical man or men of means will avail themselves of the very liberal inducements to look in at us, and satisfy themselves that they cannot find a more favorable opening in any locality for the profitable investment of their funds.

HAY AND TAME GRASSES. Since the great reduction of laboring force, occasioned by the late war, the attention of our farmers has been turned more to the production of hay and grasses than at any former period of our history. There is a large extent of unimproved territory in our county, outlying prairie, bottom and upland, that furnishes abundant pasturage for stock from the 10th of April to the middle of November. Owing, however, to the increasing influx of immigration, this outside pasturage will, in time, sooner or later, be devoted to agricultural purposes, and the stock raising community will be compelled, in a great measure, to depend upon their own private resources for this all-important item in the successful propogation of stock. Of the different varieties, we have the following, viz: timothy, red top, blue grass, red clover, millet and Hungarian grass. We will proceed to speak of each variety separately:

1. *Timothy.* There is quite an extent of land in the county devoted to the production of this hay, both in the bottom and on the prairie. It yields well, is beneficial to the soil, and the pasturage,

after securing the crop, is of greater value to the farmer than the annual rents of the same number of acres for crop purposes. Where our farmers do not cut the hay, the pasturage is ample to feed stock during the entire winter, except during the prevalence of deep snows and in freezing, sleety weather. In our opinion, pasturage of this kind is equivalent to a crop of corn of forty bushels per acre from the same number of acres. Owing to the increased demand and the high prices, much timothy has been raised for the seed, many farmers realizing from twelve to fifteen dollars per acre from the seed alone, leaving the hay still on hand for feeding and shipping. The yield of seed last year was about six bushels per acre. This year, owing to the damage sustained by rains, the yield will not be more than three or three and one-half bushels per acre. We regard timothy as the leading grass in point of value for feeding, pasturage, seed and for shipment. We usually sow during the last days of August to the 10th of September, and recommend about two gallons of seed to the acre. We have tried sowing in the spring, and find the chinch bug will destroy it *in toto*, after leaving the small grain.

2. *Red Top.* This is a grass grown in wet and marshy bottoms, and produced only where other grasses cannot be raised. Its cultivation is not very extensive in the county. It makes good feed for cattle, is considered very hard on land, degenerates, and has to be renewed every four years. There is no market demand for it.

3. *Blue Grass.* This is a grass in high repute for pasturing. It is spreading rapidly over our country, and should be fostered by every one interested in grazing and stock growing. It starts early, growing rapidly in April and May, and pushing forward again with renewed vigor in September, October and November. It is much more nutritious than our common wild grasses, growing to a good length, though not so luxuriant as the blue grass in Kentucky. It is entirely free from the ravages of the army worm, which at times proves so destructive to our timothy. It is a fine winter pasturage for sheep and other stock, many farmers reserving it for winter use alone. It is considered an improvement to land, and is an effectual barrier against washing, from the compact matting of the roots, forming a tough and elastic sod. It is not used for hay, being devoted entirely to grazing.

4. *Clover.* We have two varieties of this grass, the white and the red. The former is a native growth. It is not cultivated, being injurious to horses and a nuisance generally to the country. The red clover is an imported grass much sought after, being well adapted to this climate, where it produces two crops annually. It is valuable for the seed and as feed for stock. Dry prairie and dry bottom lands are best for its production. It is a splendid fertilizer, and is employed in a great measure for this purpose. It is liable to be killed out by hard winters. It makes the best fallow ground in the country for wheat or corn, and almost universally insures a crop of the former grain. The yield of seed is usually from two to two and one-half bushels per

acre. The proper time for sowing is in the month of February. It is entirely free from the encroachments of the chinch bug and army worm, and, in fact, all other insects. We would take this opportunity to recommend farmers to sow at least two gallons of seed to the acre, to insure a good setting of grass. We have not had proper machinery for cutting and securing the seed, therefore cannot give a true estimate of its productive qualities in this particular. Clover hay is not cut here for market, and is rarely cut at all except for the seed. It is used almost entirely for pasturing and fertilizing.

5. *Millet.* This grass is not largely produced in this county, though some farmers raise it for sheep and milch cows. It requires dry soil, growing to the hight of four feet. The virtues of this grass are in the blades and seed. The latter are excellent bird and poultry feed. There is no market value attached to the grass. The seed, however, usually rates about the same as rye. It will yield about thirty bushels of seed per acre.

6. *Hungarian Grass.* This was introduced here about nine years ago, creating quite a *furor* for a few years; but time proves all things, and this grass has been tried at the bar of public opinion, the case argued *pro* and *con*, with many adjournments and continuances; finally, an intelligent jury, consisting of the people, has pronounced the verdict, which is against the further propagation of this grass for general feeding. For sheep, it subserves an excellent purpose. Fed to horses and cattle, it produces an aggravated action of the kidneys, generating (in the opinion of many intelligent men) an excess of urine, and inducing a disease commonly called "stiff complaint." It yields from twelve to fifteen bushels of seed per acre. This is good feed for poultry, and yields a considerable quantity of oil.

We give the average yield per acre of the different grasses: timothy, two tons; red top, two and one-half tons; blue grass, not cut for hay; clover, one ton, requiring a half bushel of salt per ton to cure it properly; millet, two tons; Hungarian grass, two and one-half tons.

The aggregate number of tons of timothy hay raised in this county in 1860 was seven thousand, according to the census return. We approximate the aggregate for 1865 at ten thousand tons. There are a number of gentlemen in the county profitably engaged in pressing, baling and shipping hay to market.

HEDGES. Hedging has been tried to some extent in the county, by quite a number of our farmers. The experiment was first commenced about eight years ago. We have used the Osage orange (a native of Texas and Mexico), also, the white willow, introduced two years ago. Our own personal experience is confined to the Osage orange, and embraces a setting of one mile in length upon our farm. We plowed the ground for the hedge in the month of October, to the depth of ten inches, then replowed it in the month of April, and thoroughly pulverized the soil. Obtained our plants at one year old, from the seed; they were grown in the State of Illinois. In setting out, they were placed in one

row, a space of nine inches intervening between the plants. The ground should be just right for corn planting, as regards moisture. The plants should be set from the first of April to the first of May. They should be set in holes made by a small round stick, the roots thoroughly dampened previously, and inserted to a depth of one inch greater than when taken up for transplanting. The dirt should be gently pressed around them with the hands. In dry seasons of spring, they should be watered lightly with brook water every few days. They should be plowed and cultivated with the hoe, and kept free from weeds for at least three years. For two years they should be kept free from stock, as they would be liable to be trampled under foot. Some experimenters recommend planting in two rows, nine inches apart, with the plants a foot apart, alternating in each row. Experience has taught us that the single row is the best, being the most susceptible of cultivation and easier kept in repair after being turned out. After the first year, we cut the plants down to the height of eight inches, in March, to induce the spreading growth. In July we cut again, leaving twelve inches. The third year's growth was cut at a height of eighteen inches, in March, and again, in July, cut at two feet. The fourth year we cut at thirty inches, in March, and again, in July, at three feet. After an experience of four years, we found the hedge sufficiently developed to turn horses, cattle and sheep, but the hogs would slip through; as this was a consummation devoutly wished to be overcome, we were compelled to resort to further efforts. We, however, deferred operations until the hedge had attained the age of six years. It was, at this time, from ten to twelve feet in height, and the plants averaging two and two and one-half inches in diameter at the ground. To propagate the necessary spreading growth at the bottom, to prevent the passage of hogs, we tried the following experiment on two hundred and fifty yards of our hedge: cut the stem of the plant about half off two or three inches from the ground, take a beam and pass it horizontally across the plant on the side next the cutting, then press it down to the ground in the opposte direction, trimming all obstructing limbs, and leave it in that posltion. This should be done in February, or before the sap rises. It should be side-trimmed and top-trimmed, at the same time, to make a uniform hedge; also, hack the stem at intervals, to prevent the growth of shoots. From the cut stem and side trimmings, with the hacks on the stem, a quantity of new shoots spring up and form a thorough, almost compact matting, sufficient to turn a rabbit. In one year after this process, we turned out our hedge a perfect fence in every particular. We consider our success excellent.

At the age of five years, we noticed blossoms on some of the plants, but did not secure any oranges until the seventh year. We find the oranges attaining a perfect growth, weighing from two to three pounds. We had the curiosity to open one, and counted four hundred seeds. This demonstrates the fact that seed can be produced in sufficient

quantities at home for our own use, thus saving the trouble and expense of procuring them from a distance. We have never known any injuries received by hedges from winter weather. Our only troubles are occasioned by gophers and prairie squirrels, which work among the roots while the plants are young and tender. Our remedy for these pests is simple: take a marrow bone, remove the marrow and fill the space with arsenic mixed with hog's lard, dig down upon their road or passage-way and introduce the bone, cover it up nicely, and rest perfectly content, for the work is done; no more depredations need be apprehended from this quarter. From our own experience, we deem it admirably adapted to this climate, it being of Southern nativity, to the contrary notwithstanding. We are of the opinion that scions cut in the month of February, and carefully housed in a cool, damp cellar until the proper time, if inserted in well prepared ground to the depth of six or eight inches, will grow as well as those raised from seed. Our hedges are trimmed to a height of five feet, and a width of four feet. Use a slash hook and shears for this purpose, and trim in the months of March and July. In our opinion, four years is ample time to form a hedge sufficient for all practical purposes, proper culture and attention, of course, being indispensible to the attainment of this great desideratum. No farmer should depend upon rails for fencing, when this unsurpassable hedge can be produced at a mere nominal cost. It is not liable to be injured by the browsing of stock, owing to the bitter principle contained in it and the thorns upon it.

The white willow has been tried by quite a number of gentlemen in our county, and so far as we have learned, has proven an entire failure for hedging purposes. Willow being an indigenous growth here, we do not know whether to attribute the failure to a want of proper attention and cultivation, or to some other cause as yet undeveloped. We are acquainted with one hedge of willow, four years old, near Burlington, Iowa, where we learned from the proprietor that it was suitable for a garden fence, if kept where stock could not molest it. Otherwise it was not suitable for hedges, as stock would browse it down and ruin it. The willow hedge is easily taken care of, as it possesses no thorns; but, in our opinion, it will not be brought into use here.

Hogs. There were slaughtered last year at Alexandria, in this county, about seventeen thousand hogs, and about three thousand driven to other markets, making an aggregate of twenty thousand. The average weight was about two hundred pounds. In no branch of stock breeding has there been so little attention bestowed as in that of swine. Farmers were not formerly so particular to get good breeds of hogs, as they have been during the last eight or ten years. Almost any animal that went on four legs, had a long nose and could squeal well, was regarded good for pork-making purposes, and these were very numerous upon our farms until within a very few years. Nearly

all the different breeds of swine which have been propagated in different parts of the country, and have been celebrated for their many excellencies, have been tried in Missouri. Some have been continued in favor longer than others, while some have been at once discarded after a short trial. It is very readily admitted that no class of stock changes its characteristics so easily as swine; and from this fact, in connection with another, that farmers have not been very careful in breeding them, we often hear the complaint that the breed has "run out," which means, in brief, that they have lost their original character and qualities, and have become degenerated and of less value. When farmers learn to exercise the same care and attention in breeding them that they do in other farm stock, we may hope that the good qualities of the breed may be perpetuated, and their characteristics established and maintained through a series of years.

Since the war, our farmers are turning their attention to the necessary improvement of our stock of hogs. We have the Berkshire, Suffolk, Bedford, Irish grazer and the China breeds. The Berkshire depends more upon feeding than mast and grazing, requiring considerable attention. They are not a large hog. The Suffolk has been tried by a number, and found not suited to this climate, being too tender and not sufficiently covered with hair to protect them properly against our cold winters. They require to be well sheltered, and depend entirely on feeding, being not at all disposed to "root hog or die." The Bedford was at one time thought to be a valuable breed, but has become nearly extinct in the county. They are not good grazers, and require too much feeding. The Irish grazer we consider to be the best stock for this county and climate; they are industrious feeders, grazing and seeking most continually; they are less liable to disease, have plenty of hair, and mature at one year old, making our best pork. The China is a breed that suits our climate well; they are not prolific breeders, but can be fattened at any age for market; they are too small for general adaptation.

This county is well adapted to the raising of swine, though we may note some losses from cholera in the last few years. To prevent the appearance of this peculiar disease, we found the following recipe very effective: To every twenty-five hogs, take a quart of soft soap, a half pint of salt and two ounces of sal soda, mix with slop and administer once a week. Should the disease make its appearance, we would remark, in the treatment of a disease of this character, we have little to expect from the specific or direct action of medicine of any kind. The most that we can hope to do is to support the system so as to enable nature to overcome the disease. In a human being, with a disease of a similar character, we should first remove the patient to a healthy locality, and provide for an ample supply of pure air and good nursing. This faithfully done, would be the most important step towards recovery. We should then give, as the symtoms might require, beef tea or broths, milk, wine, whey, brandy, quinine and other

similar preparations, always remembering that the object is to sustain the animal powers so as to enable the system to withstand the depressing effects of the poison and free itself from its presence. The treatment of hogs, with this disease, must be of a similar character. Stimulants and tonics of some description, with plenty of pure air, pure water and suitable nourishment must be given. Chlorate of potash, in full doses, should be given, also half a pound of madder to every twenty-five hogs; give in two doses, one day intervening. Twelve hours after giving the last dose of madder and potash, take two gallons of flax seed to the same number of hogs, boil and make a slop, and give to the hogs. A large number of milder cases will recover without treatment of any kind, and in this, as in all epidemics of a similar nature, it will be found that the first cases that occur will be very severe, and will nearly all prove fatal, while, after the epidemic has existed for a time, the disease will seem to become more mild, and a much larger proportion will recover.

CATTLE. There are no cattle slaughtered in the county for shipment. A great many are driven out of the county to market, but not so many as five years ago. It is impossible to give any estimate of the number, as they are driven singly, by tens and by hundreds, and go in every direction. The cattle of our county have gradually diminished for a few years past until recently, both in number and quality. We had in 1860, according to the census return, an aggregate of twelve thousand nine hundred and thirteen of all ages. We approximate the aggregate number for 1866 at about the same figures. We have a few Durhams and Devons, brought from Illinois and Kentucky; these were introduced several years since, and have proved of great benefit in crossing with our native breed. The citizens are becoming alive to the necessity of improving our stock thoroughly, and are putting forth strenuous efforts in that direction. Our climate is well adapted to cattle raising. We have several large feeders in the county, and they can show herds that will compare favorably with the cattle of any section. The imported stock requires more attention than our native breeds, and, as milkers, are not in high repute. The natives, though possessing some desirable qualities, are generally faulty in form, slow in reaching maturity, poor handlers and heavy boned. They possess the one desirable trait of hardiness, and the cows are tolerable for the dairy. The working oxen are usually good, but slow, hard feeders, and producing an inferior quality of beef. The steers are sometimes turned off at three and three and a-half years old; but, owing to their late maturity, they are scarcely fit for the butcher, and make poor beef, rarely averaging five hundred pounds of profitable meat. Full grown oxen, six years old and upwards, do not average eight hundred pounds, even after several months stall feeding on hay, roots and meal, and a tolerably fatted cow, as a rule, will not make over four hundred and fifty pounds of meat.

Owing to their origin, the natives have no fixed hereditary traits,

and even those possessing desirable characteristics, cannot be relied upon as breeders to produce progeny of a like excellence. Instead of constancy, there is a continual variation and frequent breeding back, exhibiting the undesirable traits of inferior ancestors.

Were a careful selection made, and a determinate course of breeding adopted by a patient and skillful breeder, there is little doubt, out of our common material, a much improved breed might be originated, which, with judicious crossing with some one of the improved breeds, might obtain rank as a dairy animal. Among the natives are found many excellent milkers, but in giving them credit for this property, we must remember from how very large a number these good ones have been selected, and that, were we to take the average of the whole class, we should hardly be able to award them even tolerable praise in this respect. There are quite a number of dairies in the county in operation and being projected. The principal milkers are being selected from among our best breeds of natives. The amount of butter manufactured in our county in 1860, according to the census report, was one hundred and eighty-five thousand seven hundred and ninety-four pounds. The amount of cheese, for the same year, was ten thousand nine hundred and thirty-one pounds. We have some experienced dairymen in the county, and produce as fine a quality of butter and cheese as can be found in any market. We are of the opinion that we can make butter and cheese at cheaper rates than the Eastern dairies, as we possess a wider range and as good facilities for pasturing.

Horses. The number of horses in the county in 1860, according to the census return, was three thousand one hundred and eighty-five. We approximate the aggregate number for 1865 at the same figures. During the rebellion our horses were sadly reduced by the combined appropriations of the contending forces and the partisan rangers, who belonged to no particular party in the fray, but had an eye single to their own pecuniary interests, and a special aptitude for ferreting out and pouncing upon (without so much as "by your leave") all the finest horses the county afforded. Since quiet has been restored, and the white wings of peace hover over the land, the attention of horse fanciers (and who is not one?) has been turned to the replenishment of our quota, so ruthlessly diminished by the aforementioned causes. We are even now up to our old standard in number, but the quality is lacking. However, a few years will supply every deficiency in detail, and we will be able to crack our whips over as fine and dashing prancers as step the western sod.

The average price for stallions is from four hundred to one thousand dollars. For geldings, four years old and over, one hundred and fifty to two hundred dollars. Younger animals rate at different prices, according to quality. Fine brood mares, four years old and over, for horse breeding, one hundred and fifty to two hundred and fifty dollars; large, coarse brood mares, for mules, one hundred and twenty-five, to one hundred and seventy-five dollars; fine saddle geldings, two

hundred to two hundred and fifty dollars; fine buggy animals, the same figures; match carriage horses, four hundred to five hundred per span; large draught horses, four hundred dollars per span. We have different classes of horses, as above enumerated. Those principally bred in the county are roadsters and farm horses, brood animals, saddle and buggy horses. There are efforts being made to improve our stock of horses of every description. We have a start of the red Morgan stock from Messrs. Reese & Asberry's horse, of Canton, Lewis county—a horse whose fine qualities are known throughout the State, he having taken the second premium at one of the fairs of the St. Louis Agricultural and Mechanical Association, being exhibited in a ring of fifteen or twenty of the best stallions in the country; Colonel R. A. Alexander, of Kentucky, getting the first. We have the stock of the imported John Bull, first brought to Kentucky and thence to Keokuk, Iowa, owned by a colored citizen, William Kay. This horse is very fast, exquisitely muscled, and the getter of fine colts, invariably black as a raven. Mr. Charles Harr, of this county, first introduced the Black Hawk Morgan, competing for several premiums at the St. Louis fair. The stock of the county has been greatly benefitted by this horse. Captain Hull has a fine Black Hawk Morgan, two years old, from which much is expected. Judge Roseberry had a fine stallion (Kentucky Whip, dam, Southern Boston,) that sired a great many fine draught and farm horses in the county. He has a superior three-years' old, of the same stock, which bids fair to rival the sire. Mr. Philander Sweet had a horse ("Barney," since dead,) that was a splendid animal, and produced some of the finest draught and farm horses in the county.

There is an influx of immigration to our county from Ohio and Pennsylvania, that is introducing a number of fine draught and farm horses, among them some excellent stallions.

Asses. There are ten jacks, of various ages, in the county, and the same number of jennets, of various ages. We have some as fine jacks and jennets in the county as can be found in the State, showing stock that cannot be excelled. We have one jack (Hannibal,) near seventeen hands high, the property of J. N. Lewis, Esq. There are others in the county that will nearly equal him when full grown. We have found the breeding of jacks an important branch of stock raising, and fast becoming valuable for the propagation of mules. From our experience, we think our climate well adapted to asses and mules, they being less liable to diseases incident to the equine race. Asses are not raised for market, the supply being scarcely sufficient for our own necessities. These animals range in price from five hundred to fifteen hundred dollars.

Mules. There were only three hundred mules raised in the county in 1860, according to the census return. We approximate the aggregate for 1865 at the same figures. We have mules of all ages, many farmers raising them for their own use alone, deeming their health-

fulness and powers of endurance superior to the horse. Many others are breeding and raising for market. This branch of stock raising is receiving an increased impetus, and will absorb the attention of many farmers, who are procuring a number of fine brood mares, purposing to increase the stock and improve it materially. Our mule stock will compare favorably with that of any other section of the country, both in size and quality. Our principal market for a number of years is, and has been, St. Louis, for aged mules. There are quite a number of young mules bought and driven to Iowa and Illinois. Aged mules are selling at four hundred to five hundred dollars per span, owing to size and quality. Suckling mules rate at sixty to eighty-five dollars, owing to quality.

A schedule of premiums and remarks on our fair will be found under the head of agricultural societies.

FRUIT. There are a number of orchards in the county at present, of different, ages, sizes, varieties, and propagated with different degrees of success. There are several gentlemen in the county who design setting out very extensive orchards next spring, 1866. We have a fine orchard on our farm, varying from eighteen years old down, and design setting out two thousand additional trees next spring, of different varieties. Our county is well adapted to almost every kind of fruit growing, and more especially to apples and grapes. From our observation the orchards situated in the timbered districts are less liable to injury from our strong northwesterly gales, from the protection afforded by the forests. We would recommend those about to embark largely in the fruit growing enterprise to select a high, sheltered location in the timber, if possible, as our strong winds on the prairie not unfrequently blow the young fruit off the trees, and occasionally prostrate the trees themselves—an occurrence that is never witnessed in sheltered localities. We are acquainted with some orchards on our prairies that have hitherto been shattered by the sweeping blasts, that are now well protected by small groves of trees, planted on the north and west sides of the orchard. These groves are locust and cottonwood. The latter is thought to be the best for this purpose, as it is not so liable to be prostrated by wind, and does not possess the pernicious tendency to throw up sprouts from the roots, so prolific in the locust. In order to afford a more perfect shelter, it is necessary to keep the tops properly trimmed, to promote a greater spread of branches, and to prevent them from shooting rapidly up to their normal height, leaving a long trunk entirely bare of branches, which they would undoubtedly do if left to grow at will.

Our advice to farmers who design devoting their attention to the ordinary routine of farm duties is, that they should not set out more than fifty to one hundred trees of selected varieties of fruit, adapted to the climate, as they will only prove an incubus; no man being able to propagate a large orchard successfully without devoting his whole attention to it alone. In our opinion, the orchard ground should be

cultivated in corn and potatoes until the trees are seven or eight years old. Then seed down in clover for two or three years, remembering to keep it clear from grass as much as possible. The trees are more liable to be attacked by worms when surrounded by grasses. At the age of ten or eleven years turn the clover under and sow with wheat, rye, oats or some other cereal, thus alternating the crops and cultivating the land until the trees have attained the age of seventeen or eighteen years, when the ground may be seeded down in grass. The trees should be selected in February and set out in March, as early as circumstances will permit, having the ground thoroughly prepared. The trees should be set in rows, twenty to twenty-two and one-half feet apart. They should incline slightly to the southwest. In selecting trees for transplanting, due care should be exercised with regard to certain peculiarities. Trees shooting up to a height of eight or ten feet before topping out, should invariably be rejected. The height from roots to branches should not be more than four or five feet as a general thing, *never* over six feet. Our reason for inclining the trees to the southwest is this: they are less liable to the excessive action of the sun's rays during the months of July and August. Trees in this county usually incline to the northeast, and where they do so in our own orchard and others, we can point out the evil to any one, which consists of a blight of the bark on the body of the tree, caused by excessive heat, as aforementioned. When the trees incline to the southwest the branches afford shelter and shade from the burning rays during the hottest part of the day, and thus protect the stem from this deleterious influence. The young trees should be set an inch or two deeper in the ground than the depth occupied when taken from the nursery. The tops should be trimmed closely the first year, to prevent, as much as possible, the action of the wind, it being essentially necessary that the tree be kept quiet until the roots obtain a firm hold and good growth.

We have another theory concerning the transplanting of orchards, about which we do not wish a suspicion of that bugbear, superstition, to cling, as it is in accordance with and easily explained by recognized and well known laws of nature. It is this: in taking up trees from the nursery, be particular to note their bearings upon the points of the compass, and be especially careful to set them out with due reference to those bearings, setting them in the same position relatively that they occupied in the nursery, always remembering the inclination to the southwest. We have observed, in an experience of more than twenty years, that trees so handled will grow and produce better than those set at random, without reference to former position, etc.

We would respectfully recommend that trees never be transplanted under four years old, nor over six, always selecting grafted fruit, it being a sheer waste of time and money to transplant seedlings. We would not advise the transportation of trees more than one hundred miles from the nursery.

In the formation of an orchard, proper regard should be had to the influences of climate. Trees raised in our Western nurseries are, in our opinion, the only ones that should be selected, as a general rule, they being already necessarily acclimated, and better adapted to our necessities. We have no inclination to deter gentlemen from introducing choice varieties of fruits from any of the Eastern States or from Europe, if they feel so disposed. We do affirm, however, for utility, pecuniary advantages and adaptability, our Western nurseries afford ample opportunities for supplying the demands of our fruit growers generally. We will append a list of the different varieties of apples that we deem best suited to our climate and necessities. They are as follows, viz: Belle June, Prince Harvest, American, Golden Sweeting, Yellow Bellflower, Little Romanite, British Queen, Limber Twig, Golden Russet, New York Spitzenberg, Seek-no-further, Winesap, Rhode Island Greening, Early Harvest, Fall Pippin, Summer Pearmain, Red Bellflower, Big Romanite, Roger Pryor, Pryor Red, Rambo, Golden Pippin, Baldwin, Nonesuch, Red Genitan, Grindstone, Tallman's Sweeting and Maiden's Blush. We have tried all of the above varieties, and, from our own knowledge, can recommend them for selection, to fruit growers, for general utility.

In selecting fruit, due regard should be had for their adhesive qualities, or, in other words, their toughness of stem and degree of resistance to the wind while upon the tree. Among the best of these are the following: Genitan, Roger Pryor, Limber Twig, Winesap, Little Romanite and Grindstone.

Our greatest sources of annoyance and damage to apple trees are catterpillars, canker worms, borers and bud worms. After a long lapse of years, fraught with experiments, trouble and expense, we have discovered an effectual remedy for each and all of these pests, entirely harmless to the trees, and working to a charm in the utter annihilation and destruction of all insects, bugs, worms, grubs and flies attacking any descriptfon of fruit trees. In view of the expense, trouble and anxiety involved in the discovery of this remedy, we do not feel disposed to communicate it to the public, except for a consideration, deeming a discovery of such vast importance to the horticultural and pomological interests of the country worthy of a reasonable remuneration. It is our intention to apply for a patent for this remedy, and have it duly protected by law.

Having devoted sufficient space to the consideration of apples, we will proceed to speak of other varieties of our fruits, giving them that prominence which we think should be justly accorded.

Pears. This fruit has not been extensively grown in the county heretofore, but, like everything else greatly to be desired, is receiving a fresh impetus. We noticed two dozen on exhibition at our agricultural fair, in October. They were dwarf fruit, of the finest quality, and raised by Harvey Loomis, Esq., of this county. They were the Bartlett pear, and some of them weighed two and one-half pounds.

We have different varieties, both dwarf and standard, among which the following named are best adapted to our climate and soil: Seckel, Doyenne Boussock, Pound Pear, Tyson, Bartlett and Belle William. The soil best adapted to growing pears, both dwarf and standard, should be, for dwarfs, light loamy soil, with a red clay sub-soil, rather elevated, and with good drainage; for standard varieties, the soil should be high, very dry, of a loam and clay intermixture, as much as possible. Our observation is, that pears set in low ground, where water collects, are more liable to disease, and do not bear so well as those more elevated. Plant none but hardy varieties, and endeavor to procure healthy, thrifty specimens, if you wish to have a successful orchard. It has been stated by some croakers that pears cannot be successfully grown in this climate. From the number and quality of those we have grown and seen grown in the county, we would say to all persons disposed to credit such disparaging statements, obtain a few specimens of the grafted stock above mentioned, and set them out properly, having due regard to time and place, and our word for it, they will pay no more attention to the croakings and disappointed amateurs who have not succeeded, the fault lying, in all probability, within themselves, not the soil, climate or pears. The luxury of all fruits is in proportion to their durability. Pears, in consequence, are esteemed a choice delicacy, from the rapidity with which decomposition sets in after maturity. The tree is of rapid growth, but liable, like all other fruits, to disease. The only disease prevalent is what is variously termed blight, fire blight or frozen sap blight, affecting the boughs.

Peaches. We have several different varieties of peaches growing in the county, producing more or less every year, though an ordinary crop cannot be depended on oftener than every other year. We think, with proper care and attention, they can be successfully grown in the county. We would not advise any one to embark largely in this enterprise, planting only sufficient to give variety to their fruit, and sufficient for home consumption. The trees are liable to be winter-killed above ground. High lands bordering the river are considered the best localities for peach growing in this county, the trees being more secure against winter, and producing more fruit. The tree is liable to the attacks of a white grub among the roots, which, if not eradicated, will kill it sooner or later. These grubs generally make their first appearance when the tree is three or four years old. The mode of destroying this grub is very simple; we give it here for the benefit of all. Remove the surface dirt from around the trees, exposing the roots, take half a bushel of leached ashes, mix with one-fourth pound of sal soda, scatter this over the roots, and leave it thus for one week, after which time the dirt may be replaced. The grub will give no further trouble.

Quinces. There are but few of these grown in the county, and these principally for dwarf pear stock. If properly cultivated, we

think they can be grown here as near perfection as in any section of our country. The same soil should be used and general directions observed in propagating quinces as laid down for dwarf pears.

Apricots. There are very few specimens of this fruit grown in our county. They are not considered specially adapted to this climate, being too tender as a general rule. We have, however, seen some very choice ones grown here, and think, with great care and attention, they might be acclimated and very successfully propagated.

Plums. We have a great variety of this fruit, both cultivated and native to the country. Among the different varieties of cultivated plums are the Chickasaw, Green Gage and Blue Damson. We have some varieties growing wild that are equally as fine as any above enumerated.

Cherries. Of this delicious fruit we have several choice varieties in the county, and they grow to great perfection. Principally among them are the Prince Napoleon, Princess Napoleon, British June, May Duke, Black Heart and Morello. The Black Heart and Morello being the earliest cherries putting forth in the spring, do not succeed so well as the other varieties, being frequently blasted by late frosts. All the varieties, however, bear in great profusion in favorable seasons. There is no more choice delicacy for the table than cherries, as they may be served in several different styles. We would advise a general propagation of this fruit throughout the country. The British June is the surest bearer, putting out very late, and producing a crop every year. We have tried them for twenty years, and never knew them to fail. The tree is smaller than the other varieties, but is very prolific.

Currants. There are several varieties of this most excellent fruit grown in the county, among them the red, white and black currant. The climate is well adapted to their growth. They are a choice table fruit, and are much sought after. They are principally used for jelly and wine making, For the latter purpose they are not excelled by any wine producing fruit in the country. We have sampled some wines manufactured by M. M. Doud, Esq., of Athens, that are certainly superior to any grape wine we ever tasted. He manufactures from both red and white currants. They grow to great perfection and in great profusion, and can be made very profitable for wine making. We have a specimen of the Russian currant imported and distributed by the Agricultural Bureau at Washington. This currant is a superior fruit, growing to the size of common marbles; it is well adapted to our climate, and we think they will prove vastly beneficial to our country.

The different varieties of small fruits not mentioned at length, such as strawberries, raspberries, blackberries, dewberries, gooseberries and service berries, grow in great profusion throughout the county, both in a wild and cultivated state.

All of these fruits are propagated by many of our citizens, and are brought to a degree of perfection not excelled by any county in the

West. There is a commendable spirit of enterprise in this laudable undertaking, and among all branches of husbandry no one branch will yield a greater per centum of pleasure, profit and satisfaction for the trouble incurred, than the culture and propagation of these various and delicious small fruits.

VINEYARDS. We have as yet no vineyards of any magnitude that are producing. A great many persons have a few vines, yielding sufficient grapes for family use. M. M. Doud, Esq., of Athens, has quite a number, from which he manufactures fifty to seventy-five gallons of wine annually. Of the different varieties, he has Catawba, Isabella, Hartford Prolific, Rebecca, Concord, Diana, Delaware and Iona. There are two families from France, Messrs. Therme and Comfrey, residing near Athens, who have a vineyard of six acres, and are preparing to increase it this fall to twenty or twenty-five acres. They are practical vineyardists, having devoted their entire time to grape culture in Europe. They use only the Catawba for the vineyard. There are some other small vineyards in the county that are being propagated, and will be materially increased.

We think our county well adapted to grape culture, there being a large amount of land especially suited to this purpose. All that is required to build up the vineyard interest is competent men of practical knowledge, and the necessary capital to invest in this important branch of industry.

The success of a new vineyard depends most upon the proper selection of its plants. It is all-important to use none but well acclimated plants, and only such varieties as have proved themselves of undoubted good quality. As long as new kinds have not been thoroughly tested, they should not be chosen for extensive planting, even if they can be procured as cheap as old standard varieties in which the country abounds. The next thing to be considered is the spot on which certain varieties will thrive best. Their time of ripening and maturity must be brought into conformity with the locality. For instance, an early-ripening grape vine should be set on the coldest and shadiest place, while a late grape should have the best chance in the vineyard, so as to ripen at the same time with the rest of the crop. Then again, if the object is to raise grapes for making wine, none but the very best varieties should be selected, and those always with due consideration to the climate and soil of the locality where the vineyard is to be established. The varieties chiefly cultivated in this county are Catawba, Concord, Delaware, Diana, Isabella and Iona. These we consider, from our experience, the best adapted to our soil and climate. The Catawba, Iona and Isabella are less liable to blight, mildew and the various diseases incident to grapes. The recently imported and improved varieties will do equally well in favorable seasons, but cannot be depended on for constant bearing. We would advise the propagation of but few varieties, and those only that are well acclimated and will produce with regularity. It is, in our opinion, rather an empty

honor to boast of a great variety of vines, with but two or three varieties of grapes. We have several varieties of wild grapes growing profusely throughout the county, from which some fine samples of wine are manufactured.

We are convinced, from the knowledge, practical experience, untiring energy and perseverance manifested by our grape growers, prominent among whom are Mons. Joseph Therme and Brothers, Mons. Comfrey, M. M. Doud, Esq., and A. M. Faxton, Esq., (the two last named gentlemen residing in Athens, the former about three miles distant,) we will soon be able to compete, at the various horticultural societies of the West, with the oldest and best producers and manufacturers in the country.

CONCLUSION.

Some ancient "wise saw," in his quaint homilies on things "wise and otherwise," has left to the world for their guidance in affairs terrestrial, the following maxim, "never make two bites of a cherry," which, we think, without affecting the least degree of egotism, we have followed *verbatim et literatim*, in the exhaustive consideration of the different subjects upon which we have discoursed; utterly disregarding the counsel of another "sir oracle," among whose trite sayings occurs the following: "don't put all your eggs in one basket." May we not indulge the hope that, taking the precaution to place them in separate compartments, some at least of our golden eggs may escape destruction in the event of a general smash up, and disseminate throughout the land ideas, even though germinal, that will in their growth and practical consideration be of benefit to the race in general, and the agricultural community in particular.

That "man's chief study is man," is an axiom, and for that reason indisputable. Our worthy "State Board of Agriculture" seem to have been imbued with the spirit of this maxim, when considering the manner in which they could best obtain facts and statistics for the formation of this important work; they appealed to the intelligence and practical knowledge of gentlemen throughout the State, for a clear, succinct and authentic statement of their views and opinions upon the several subjects presented for their consideration, with a view to publication and general dissemination, through different channels, among the people of our own and possibly neighboring States, thus affording opportunity for "man to study man," and by a judicious comparison and elimination of ideas, both abstract and concrete, to evolve theories which, practically applied, will prove incalculably beneficial to the present and future generations. The "State Board of Agriculture" have inaugurated an important step in the advancement of our material interests, one with which we heartily coincide, and in which we shall most cordially assist to the extent of our ability. "Prove all things, hold fast that which is good," is an injunc-

tion of Holy Writ, none the less applicable to our agricultural and mechanical teachings, and the very foundation of that eminent degree of success for which we are ever striving, and which this work and others of its kind will stimulate and assist us to attain.

Anything like a *resume* of our contribution to this work would be a mere repetition, and we imagine those most interested will obtain a more definite understanding by a careful perusal of the different subjects under their appropriate headings. We have endeavored, from our own experience and authentic data at hand, to collate a few facts and theories as a contribution to the agricultural literature of our State. Taking the *ipse dixit* of no man, but demonstrating practically the benefits of our theories, and being convinced of their utility, we have no hesitation in sending them forth as harbingers of great good to mankind. This being the first time we have been called upon by the State for a contribution of the kind, and pressing business engagements demanding our attention, we have not been able to devote the time to the elaboration of the subject that is required by one of such magnitude, and involving such diverse interests. Should a similar work be projected at some future time, we would gladly assist in furnishing material for publication, hoping, with the advancement of science, agriculture and the mechanic arts, to supply a paper more replete with practical utilitarian ideas.

Taking a deep interest in the welfare of our noble Missouri, we shall await impatiently the appearance of this volume, which is destined to exercise a vast influence upon our future. Until then, *vale*.

COLE COUNTY.

JEFFERSON CITY, November 1, 1865.

L. D. Morse, Secretary Missouri State Board of Agriculture:

DEAR SIR: In reply to your questions in your circular of June last, I send you the subjoined replies, affecting this county.

GENERAL DESCRIPTION. The general character of our lands is fertile, rolling and easily cultivated. The soil is limestone, away from the alluvial bottoms of the rivers and creeks. The Missouri river, which bounds it on the north, furnishes a large body of land equal in fertility to any under the sun. The Osage, on its eastern and southern boundaries, presents a similar formation of fertile alluvium. Besides these two large streams, the Moreau creek runs through the county, and these three water courses drain a variety of smaller streams, making this county as well watered, perhaps, as any in the State. The latter rarely fails to furnish an abundant supply of stock water. The water

is generally hard. The Moreau affords an ample and constant supply of fine water power.

TIMBER. Our forests furnish us with an almost inexhaustible quantity of oak, hickory, ash, white and black walnut, linden, elm and maple. There being little prairie in Cole county, the reproduction of timber goes on as fast as its consumption. Wild plums, grapes, hickory, walnut and hazel nuts and persimmons, form our chief wild fruits.

LANDS. No government lands in Cole county. The average price of improved farms is $10 per acre; of unimproved lands about $5.

MINERALS. There are various kinds of calcareous rock in this county; the most valuable is a silicious limestone, of which the Capitol is built. Coal is found in large quantities, chiefly in deposits. The working, however, has been done on a very limited scale, and is much interrupted by water. If a sufficient demand existed, the working of our coal pits might be made profitable. Iron ore exists. Lead has been extensively worked, but not very profitably. No copper of any consequence. Coal oil not yet discovered, though a general opinion exists that a proper exploration will discover it.

MILLS. Number not known, but presumed to be ten or twelve. No foundries nor woolen factories.

IMPLEMENTS. Nearly all the modern implements are used, and with the usual success. No factories of such implements, save plows, exist here.

AGRICULTURAL SOCIETIES. A society existed a year or two ago, and two fairs were held, one in 1860 and one in 1863. An association of gentlemen own the fair grounds, and held a fair in 1865. The fair grounds are well laid off, and are eminently calculated for the purposes of exhibition.

POPULATION, ETC. Not more than one-fifteenth of the county is in cultivation. Present population about nine or ten thousand.

PRODUCTIONS. Our principal productions are wheat, corn, tobacco, oats, barley, flax, potatoes, (sweet and Irish) sorghum and fruit.

Wheat. The average yield among the best farmers is twenty bushels per acre. I have known thirty-five raised, very frequently twenty-five. The average of the county will not exceed ten. Fall wheat entirely cultivated. Sub-soil plowing is not much adopted, owing to the natural drainage of our clay soil; have heard of no experiment of under-draining. [See census for aggregate amount.]

Corn. Average yield per acre about thirty bushels. No variety preferred, the choice being between the large white, the gourd seed and the yellow. The latter is preferred for stock, and is generally fed on the ground in winter weather; hogs feeding on the residue. Corn is usually cut up in the fall and put up in shocks. [See census for aggregate amount.]

Rye. Average crop about fifteen bushels.

Oats. Average crop about thirty bushels.

Barley. Winter barley preferred; average, fifteen bushels.

Buckwheat. Little raised, except for domestic use.

Potatoes. Irish potatoes are exceedingly uncertain in their yield. In some years the production to the acre is two hundred to three hundred bushels, in others the crop is an entire failure, not worth digging. Sweet potatoes commonly turn out well, especially in dry seasons, and are of fine size and excellent quality.

Sorghum. Now generally cultivated; no particular variety preferred; a strong soil considered best; no sugar made from it here as yet. We use the common horse wooden mill, but preference is now manifesting itself for improved mills of iron.

Hemp. Not much cultivated; average yield about seven hundred pounds to the acre.

Flax. Raised generally for domestic use; average turn out of seed about seven bushels to an acre.

Cotton. Cotton raised, but not generally; average product about eight hundred pounds seed cotton or two hundred pounds clean cotton; succeeds best on strong land.

Tobacco. A good deal raised in former years, but owing to the scarcity of labor, the crop has greatly diminished; average yield about one thousand pounds to the acre. Each planter has a chosen variety, but why I have never been able to learn, as it is impossible to distinguished the kind when the crop is prized. The excellency of tobacco depends not on the variety, but on the care and curing. The crop is considered impoverishing to the soil, for the two reasons, among others, that it returns nothing in the shape of manure, and it leaves, in midsummer, the land exposed to the direct rays of the sun.

Sheep. I am sorry to say that Cole county has very few sheep. Admirably adapted, from the nature and extent of its wild grasses, this county presents the singular anomaly of its citizens preferring to raise a crop of worthless curs to a crop of sheep. Our laws do not protect the sheep raiser. The former owners have gradually had their flocks lessened, and now the number of dogs in the county is double, nay, quadruple, that of the sheep. Can you do anything to remedy this state of things?

Hay. The grass crop of this county is large and steadily increasing. Clover and timothy are commonly preferred. Hungarian grass is going out of fashion, because of the prevalent opinion that it is prejudicial to horses. The average yield of hay is one ton to the acre.

Hedges have been tried on a scale so limited as not to justify any further notice.

Hogs. Hogs flourish. The mast (acorns), the wild fruits and the abundance of grasses and water, make this county peculiarly favorable to the raising of swine. The Berkshire is the favorite breed. I have no means of knowing the amount of pork exported,

Cattle. Cattle are raised here generally for domestic use. I know no person breeding expressly for the dairy, though, from the demand

for milk and butter at the capital, a dairy farm would pay well in this county.

Horses. A good deal of attention was paid to the raising of blooded horses before the war. This production was checked during the continuance of hostilities. Our breeders are now resuming the attention to this branch of domestic economy, and with fair prospect of success. The average price of good horses is one hundred and fifty dollars.

Mules and Asses. A large number of mules are raised here, and sent to St. Louis, where they are disposed of.

Fruit. Our people are paying great attention to fruit; orchards are being planted in almost every direction in the county, and the success of our orchards has been great. One of our fruit growers realized, I am informed, about two thousand dollars from his peaches. This crop rarely fails, and is highly remunerative since attention has been paid to the selection of choice varieties. I have no means of knowing the export of apples, but it must be large, from the immense quantity raised in the county beyond the local demand. I have never known a better region for the peach and the apple. Pears, and cherries, and plums do not succeed so well.

Vineyards. The culture of the vine is attracting increased attention. There are several vineyards in the county, the largest of which does not exceed four acres in extent. Several more will be planted around Jefferson City during the approaching year. The varieties most popular here are the Concord and Virginia Seedling.

Altogether, taking into view its capabilities to raise in abundance and excellence the varied agricultural products of the State, its fertile soil, the cheapness of its lands, its extent of timber, its abundance of water, its general salubrity, and the easy access of a market through its rivers and the railroad, Cole county presents to the farmer inducements rarely met with, and the population pouring into our county from abroad has proved itself aware of these advantages.

JAS. L. MINOR.

COOPER COUNTY.

BY J. L. STEPHENS.

This county embraces 567 sections of 640 acres each, or 362,880 acres of land, situate in or near the geographical center of the State, and between the Missouri river on the north, and the Pacific railroad on the south. Its surface, excepting small portions bordering on the Missouri and LaMine rivers, is what may be termed level or agreeably undulating, and the face of the country well diversified with timber and prairie. Its soil is fertile. "The strata of Cooper county range

from the alluvium to the third sandstone, or near the base of the calciferous sandrock."—*Prof. Swallow.*

Its rivers are the Missouri, bordering twenty-seven miles on the northern boundary line of the county; the LaMine, with its meanders, makes a length of about forty-seven miles, and the Blackwater traverses about fifteen miles in the county. The force of the current of the two latter rivers is from two to three miles per hour. When the resources of the county shall have been developed, the LaMine and Blackwater rivers will be found useful for purposes of navigation to points twenty to fifty miles west and southwest of the city of Boonville. The principal creeks are the Petite Saline (little salt), heading in the southwestern portion of the county, and extending northeastwardly to the Missouri river; and the Moniteau, heading near the same place, and extending eastwardly through the southern portion of the county, to the Missouri river.

The streams above named, with their tributaries penetrating different portions of the county, furnish over one hundred and fifty miles line of creek and river, any section of which will furnish abundance of water for manufacturing purposes by steam, and besides, each of said streams furnish many good sites for the direct application of water power. This county abounds in springs—fresh, brine and sulphur. The water of the fresh springs is soft; that of the brine can be worked to great advantage in supplying this section of the State with salt, and the sulphur is highly esteemed for its medicinal qualities, and lattery, for the evidences it furnishes of inflammable gas or petroleum.

TIMBER. The varieties of timber most abundant in the county are the burr, white, chesnut and black oaks; white, black and blue ash; black and white walnut; wild cherry, sugar tree, white maple, hickory, elm, mulberry, hackberry, linn and sycamore.

Its wild fruits are plums, pawpaws, crab apples, wild cherries, mulberries, service, May apples and red haws or apples; and its principal wild shrubs and vines are cedar, prickly pear, gooseberry, blackberry, raspberry, black haws, summer and winter (or fox) grapes, dewberries, strawberries, etc.

LANDS. There are no Government lands in the county, and little or none held by corporations, but considerable amounts are held by non-residents. I would estimate the improved lands at about eighteen dollars per acre, and the unimproved at nine dollars per acre, making an average of both at thirteen dollars and fifty cents per acre.

MINERALS. The following rocks are found in this county, viz: Hydraulic limestone in great abundance. It has never yet been worked, but it was analyzed by Dr. Litton, of St. Louis, who says, "it belongs to the cements of the first class." This rock crops out in all the bluffs between Boonville and the mouth of the LaMine river—eight miles distance, on the south bank of the Missouri river—and may be found extending over an area of about 20,000 acres of land immediately

west and south of Boonville. Archimides limestone, valuable for building purposes. Encrinital limestone, valuable for quicklime, found in immense quantities, especially on the Blackwater and La Mine rivers. Magnesian limestone, valuable as a fire rock. Chouteau limestone, a formation first discovered in this county, valuable for hydralic properties, and noted for its numerous and beautiful fossils. Lithographic limestone, and Onondaga limestone, or Cooper marble, are found in great quantities on and near the LaMine.

Sandstones of different kinds. I know of one bed of pure, white and very friable sandstone, in the central part of the county. It has never been worked or scientifically examined, but it seems to the writer to be inexhaustible in quantity, and of the very best quality for the manufacture of glass. The saccharoidal sandstone is also found in some parts of the county, in great abundance. Fire clay, found in abundance near Boonville. Coal has been but little sought for as yet in this county. It is supposed to exist in large quantities in the vicinity of the city of Boonville, and in the neighborhood of the village of Coal Bank. Here is what Prof. Swallow says of coal in this county: "This mineral exists in such quantities as will meet all the demands of the county for domestic and manufacturing purposes." Not estimating some of the best beds in the county, he proceeds: "There are at least 60,000,000 tons of good available coal, and besides the local deposits, promise to furnish a large amount of the very best quality for all ordinary uses." The beds thus far worked are from four to fifteen feet under the surface, and from two and a half to fifteen feet thick. Iron exists in the county, and in quantities that would "pay" at two places, but for that "everlasting" mountain of iron down southeast of St. Louis. Brown hematic is the quality found. Lead is found in but one locality, and that is on lands of William L. Scott, west of LaMine river. It was never worked to any considerable extent, but no doubt exists but that it may be worked with success.

Coal Oil. No experiments have been made in boring yet, but it is believed that in less favored localities than ours it has been discovered.

Mills. There are eight flouring mills in the county, and one woolen factory is now being established in the city of Boonville, by Matthew Gaunt, Esq.

Implements. There is no agricultural implement manufactory in the county, or in this section of the State. Such an enterprise here would be advantageous to the State, and profitable to its owners.

Agricultural Societies. The Missouri State Agricultural Society was established in the city of Boonville, in 1854. It was the first of the series of great fairs west of the Mississippi. Great success attended it; and after the State was districted, the "Central State Fair Society" continued in existence with much success and usefulness till the commencement of the war. Its fine property, second to none in the State, except the St. Louis society, was at various times, and in

extremely bad weather, occupied as a camp for large armies, and its improvements nearly destroyed. At some early day, this society will be reorganized. A little over one-third of the county is in cultivation, and its population is over 18,000 souls.

CORN is the most valuable crop in the county. The average yield per acre is about forty bushels. The largest yield ever raised in the county, and, indeed, in the State, so far as we know, was by H. R. Menifee, in 1855. The State Fair ascertained, from actual measurement, that his yield, off an average area of at least five acres, was a little over one hundred and fifty-five bushels to the acre. H. D. English's yield, same year, was a little over one hundred and forty-nine bushels to the acre. [See report of State Agricultural Society, 1855.]

WHEAT. This I consider the second crop in point of value. The average yield per acre among the best wheat farmers is from twenty to twenty-two bushels per acre, and the average throughout the county about twelve bushels per acre. Neither sub-soil plowing, drilling nor under-draining have been tried to any considerable extent.

Corn, oats, barley, buckwheat and potatoes are all profitable crops in this county.

SORGHUM has been cultivated to great advantage, and is growing in favor of our farmers as one of the staple crops. The imphee is considered the best variety, and it is thought the sandy uplands produce the sweetest cane. Sugar has not been made from it here. The Victoria Patent Cast Mill has been advantageously used in making molasses.

HEMP AND FLAX SEED. Soil well adapted to these productions, but our farmers, as a general rule, have never devoted themselves to their production.

COTTON. But little attention is given to this crop. Soil too rich, and climate not adapted to its early maturity.

TOBACCO. This crop does very well. But few farmers, as yet, have given it attention, but those who have, find it the most remunerative of crops.

HAY AND TAME GRASSES. The hay crop is receiving the attention of farmers. Timothy and clover principally cultivated. This is perhaps one of the most productive crops grown, considering the small amount of labor now required for its raising and preservation. The blue grass is a spontaneous growth in timber or prairie, wherever the grounds are pastured.

FRUITS AND VINEYARDS. As to the production of apples grown in this county the present year, I have ascertained that Henry S. Meyers, Esq., Hon. Henry Elliott and others, have shipped from Boonville, per river, at least 25,000 bushels. About the same quantity has been shipped, on railroad, from the south end of the county, and the average yield to the shipper, two dollars per bushel. A like quantity has been dried in this county, yielding the same, making an income from

this single fruit of at least $200,000. What may not this reach when real attention shall have been given to this production?

This county, as well as the State generally, is well adapted to the cultivation of fruits. Apples, peaches, pears, plums, strawberries, raspberries, etc., grow to perfection. Grapes do finely. The Cawtawba has been the staple grape, but is giving way to the Concord, Delaware and Virginia seedling. The Isabella is now considered almost worthless. The Clinton does well. The winter apples of New York are mostly fall apples here. The Genitan is the standard winter apple, the Winesap, New Town Pippin and others, for variety's sake. The earliest are the Early Harvest, ripens last of June, do to cook or ship until the middle of June; others in succession until the first of November, by which time our winter apples are generally gathered, and many of them kept until June of the next season.

Strawberries ripen about the tenth or fifteenth of May, and last about one month. We have fresh fruits to pluck from the vines, in succession, from the tenth of May until November. Peaches ripen from the twentieth of July until November. The average yield per acre of wine is three hundred gallons; average price per gallon, two dollars; cost of producing it, one-half.

HORSES, CATTLE, MULES, ASSES, HOGS. I will make live stock the subject of a future letter. I will merely state that Cooper is one of the best stock counties in this great State. The attention of the farmers here is perhaps more universally devoted to stock and grain crops than in any other single county.

CRAWFORD COUNTY.

BY B. SMITH, ESQ., OF CUBA.

Crawford county is situated on the Southwest Branch of the Pacific Railroad, about ninety miles southwest from St. Louis, and forty miles southwest from Pacific Station, the junction of the Southwest Branch with the main line of the Pacific Railroad. The Southwest Branch runs across the north end of the county. This part of the road was built to Rolla, its present terminus, in 1859 and 1860. The county is about twenty-three miles wide, from east to west, and thirty miles long, containing about six hundred square miles. The present population is about five thousand. Although this part of the State has not suffered so much as the border counties, still, the unsettled state of affairs and the drain of men to the army, put an entire stop to all improvements, while some farms were entirely neglected.

The earliest settlers came to this county from the different Southern

States, about fifty years ago, and the county has been acquiring its present population mostly from the same quarter, till about six years ago, when a considerable emigration from the North and East arrived; but the first few months of the rebellion sent most of them back across the Mississippi river.

The present population being only a little more than eight to the square mile, there remains a large proportion of our lands untenanted, inviting the energy and capital of the emigrant to a handsome reward of enterprise. There were granted about seven thousand seven hundred and fifty acres in this county to the railroad company, by Congress, the most of which the company still own, their financial embarassments having prevented the settlement of their lands.

There are about ten thousand acres of land still belonging to the United States Government, now open to entry under the homestead law. Some three thousand acres have been entered since the law went into operation, and are now occupied by actual settlers. Of this land, any loyal man can obtain eighty acres, within six miles of the railroad, or one hundred and sixty outside of that limit, the cost of which will not exceed twenty-one dollars for an entry; the title to be given on proof of five years actual occupation and cultivation of the homestead. While these lands are far from being the smoothest and most fertile in the county, they still possess many points of attraction to the laboring man of moderate means. They are mostly high rolling lands, thinly timbered with the various kinds of oak and hickory found in the Southwest, on the ridges, and with elm, walnut, hackberry, persimmon, pawpaw, redbud, etc., in the valleys. They are universally healthy, being from one to two hundred feet above the bed of our streams, and from six to eight hundred feet above the Mississippi at St. Louis. There are a good many farms in various stages of improvement, as well as unimproved lands, that can be bought of private individuals at from three to fifteen dollars per acre, according to improvement and location. The bottom lands and prairies in this county are equal in fertility to any lands in the State, and well adapted to the cereals. Our ridge lands, which have, till lately, been quite neglected by the old settlers, are proving to be really the most valuable, in consequence of their adaptation to the cultivation of fruits, while they are fully equal to the bottom lands for stock.

In the general activity of agricultural pursuits that the coming years are to develop in our country, none are to take so high a position as the department of horticulture, or, rather, pomology, and I do not know of any part of Missouri that is better adapted to this business than Crawford county. Fruit trees and vines grow well, and perfect their fruit, and are very healthy. This business requires but little land, and the thin lands of our ridges are just the kind adapted to its successful pursuit. A person desiring to connect stock and fruit together, could find many a farm among our ridge lands, now owned by the Government and the railroad company, within a short distance

of the railroad, that would suit his purpose well; and when we reflect that horticulturists, as a class, stand high in every community, for refined taste, general intelligence and purity of life, this peculiar adaptation of the healthy rolling lands of our county to horticulture is prophetic of a high state of society, at no distant day.

Our streams are the Meramec, six to eight rods wide, which runs diagonally across the county, from southwest to northeast, a little north of the center, and the streams that run into it are all rapid, clear, rocky-bottomed streams, with well wooded, fertile bottom lands, adapted to corn, hemp and cotton, and with abundant opportunities for building dams to any amount that the future of the country can ever require. Brush creek is the only stream of importance in the north part of the county. This, with its tributaries, furnishes abundant water to the numerous farms along its borders, and waters a large extent of country, till it empties into the Burbois, in the edge of Gasconade county. A traveler passing through our county, on the railroad, will be on a high ridge between the two streams, the Meramec south and the Burbois on the north of the road. He will have a fine view of the distant valleys on either side, and the frowning bluffs beyond.

Our prairies are small, from forty to eight hundred acres each, and all occupying the high lands north of the Meramec river. There is in the county about two thousand acres of prairie land, all of which is owned by private parties, and mostly under cultivation. South of the Meramec the country is more rolling, while there are many fine farms in this part of the county. Its greatest value, probably, lays in its rugged hillsides, where lead, iron and copper abound in considerable quantities, and coal is found in several places, both north and south of the river.

MINING has not been prosecuted with much energy or skill. Northern capital and enterprise will yet develop vast treasures among these hills. Bituminous coal, no doubt, exists in quantities sufficient to be of practical value. It crops out in six different places, and has been tested for the forge, and pronounced equal to any brought from St. Louis. Rocks abound in all the bluffs. Sandstone, probably, predominates. Limestone may be found in almost every section, but generally of an impure quality, mostly mixed with sand. Clay, for the manufacture of brick, is abundant in every neighborhood. There has been lately started in Cuba an establishment for the manufacture of pottery, where an excellent article of Rockingham yellow ware and the common stoneware is made.

There are three flouring mills and two saw mills in the county, and many more wanted, and many places to build them, where water power is abundant. A steam stave mill has been in operation near Cuba about a year.

There has been no agricultural society yet formed, but the interest being awakened must soon eventuate in one.

There has been a great deficiency in improved implements of agri-

culture. Till the last two years, reaping and mowing machines have been but little used. Even the revolving horse rake has been seldom seen. I think there have never been but two sub-soil plows used in the county, but these have promised well. There has never been a horse pitchfork here yet, and but one horse rake on wheels. Our methods of cultivation have been rather primitive. Some of our plows would be a valuable acquisition to P. T. Barnum. They would make our progressive Yankees think of Noah's ark. A large part of the plowing has been done with very small plows, and even with one horse or mule. There is more plowing done less than three inches deep than over that depth. Nine-tenths of the grain and grass in the county is cut with cradles and scythes, and raked by hand. Until our people will use larger plows, heavier teams, and plow more than twice as deep, their crops will continue to be less than half what they ought to be, and will be frequently shortened by every temporary drouth, and ruined by long ones.

The yield of wheat is from fifteen to twenty bushels; corn from thirty to eighty; rye has not been much raised, but does well as far as tried; oats are a common crop, but mostly fed in the bundle; they do well.

SUGAR CANE is getting to be a staple article. It is mostly made up with wooden mills, and boiled in common kettles. A few persons have tried iron mills and evaporators with good success, making a better article and one-third more molasses. No attempt to make sugar has been tried, but the syrup is a decided success. The kind mostly used is sorghum.

COTTON has been planted in small patches for domestic use to a great extent for many years, and with usual success. The yield is about three hundred pounds per acre. At the present high price of the staple, it would pay better than most any branch of agriculture.

TOBACCO has been a common crop by a few of our people, and is profitable. They make more money in the sale of it than the poor human worm does that chews and smokes it.

SHEEP have been kept in small flocks by most of the farmers. I do not know of any person owning more than one hundred; they are mostly of the common breed; but I do know of several men who would make sheep husbandry their principal business, and would introduce the most approved breeds for wool and mutton, if a few thousand of the worthless curs that infest the country could have their wind stopped. Until our people are educated up to the point when they can value a sheep higher than a dog, and agriculture and manufactures better than opossum and coon hunting, I suppose our annual crops of nutritious grasses will grow to "waste their fragrance on the desert air," and our rapid streams send their babbling waters to cool the mean whisky of our Southern brethren, instead of making cheap clothing for our ragged people and mutton to feed them, instead of the dogs.

Although nature has done so much to make this a stock country, till within the last few years but few persons attempted to raise the tame grasses; even now, not one-half the farmers in this county raise an acre of any kind, except "crab grass," and that, usually among corn. The high prices paid by Government for hay has caused a few persons to grow largely of timothy and red top. Timothy grass pays well here; the yield of hay, under fair cultivation, is one and a half tons per acre; good, deep plowing and thick seeding early in September, if not too dry, will give that amount on three-quarters of all the land in this county. Clover has not been tried extensively, but has done admirably so far as tried. Cattle do well, but they are mostly of the common breed, and well run down at that. An average cow will not weigh over three hundred and seventy-five pounds; an average four year old steer is about four hundred and seventy-five pounds, (fatted on grass,) but the fault is in the breeding, not the grass. I have killed many hundreds in the last four years, with this result. The summer pasture is very abundant and nutritious till about the first of October, when good tame grass should be ready for stock. The method has been to let cattle run through the summer and get fat; sell off what can be spared, and keep the rest on the very least possible amount of "roughness" that will subsist an animal and keep strength enough in the body to begin with in the coming spring; in this way it takes one-third of the summer to recover the losses of winter starvation. I have no doubt but one-half the entire neat cattle of this county, with horses, mules, sheep and hogs, go through the winter season with no more food than would be required to feed them well two weeks. There are a few exceptions to this style of stock raising, and they are annually increasing. There has been no trial of "blooded" cattle that I have heard of; there are no persons breeding cattle for the dairy, and there are no dairies here, although no branch of industry would probably pay better; cattle are healthy, feed abundant, market convenient; price of butter forty to seventy-five cents, cheese fifteen to twenty-eight cents.

HORSES are easily raised, and are raised by all the farmers, though not with that care in feeding or breeding that should be observed, though more pains are taken with them than any other kind of stock. Mules are raised by many, and with probably more profit than any other stock, unless sheep may be an exception; they mature earlier than horses, are more healthy, longer lived, easier kept, will do as well to break at three as a horse at five years old, and will stand the heat much better and cost less for shoeing, and bring a better price in the market.

HOGS are perhaps the most neglected of any kind of stock. The common breed of the country, the "pointer," is the almost universal hog here, and a meaner one cannot be found in any country. Fortunately, the unexpectedly severe winter of 1863–4, did much towards the extermination of these relics of barbarism. There are a few better

hogs being introduced, and still there is room for improvement in these. The average weight of hogs slaughtered would not exceed one hundred and thirty-five pounds.

I have not seen a rod of hedge in the county, but as the Osage orange grows well here and matures its fruit in average seasons, it will no doubt do finely.

FRUIT should be the great staple of this county; a large majority of all the farms would bring to perfection any of the fruits usually grown in temperate climates, with better profit to the grower than any other crop.

Till within a few years the improved varieties of apples have been cultivated to a limited extent. Previous to this season I doubt if there has been produced in any one season ten bushels of budded peaches, and yet thousands of bushels of seedlings are grown. Within the past three years the first apricot or nectarine was grown here, and probably the first pear, other than a seedling. Now, apples, pears, peaches, apricots, nectarines, plums, cherries, blackberries, raspberries, strawberries, gooseberries, currants and grapes of many of the most approved varieties, have been tried and succeeded well, equal to our most sanguine expectations. It has been said that we cannot raise long-keeping apples here; it is true that many of the most noted long-keeping varieties, in the North and East, do not preserve their long-keeping qualities here; but we have many varieties adapted to our soil and climate, that, for all the qualities of a delicious and enduring fruit, cannot be surpassed in any country. Every variety of apples raised North, when grown here, is so much superior in size, color and general appearance, that skilled pomologists frequently do not know them. The same may be said of plums, while grapes of Northern origin often surpass themselves in all that pertains to sweetness and delicacy of flavor. The curculio in plums and apricots has not made its appearance. Blight in pears to a very limited extent. There have been some four or five thousand apple trees set in this county in the last five years, mostly in small lots. I know of three orchards, numbering more than a thousand apple trees each, with other fruits in proportion. Grapes have not received the attention that they merit. Still there have been a good many small beginnings and much inquiry on the subject.

GRAPE CULTURE has been kept back among our people by the overestimate of the cost of growing vineyards, many persons insisting that one or more hundred dollars must be laid out to the acre in trenching, before vines can be set with reasonable hopes of success. This notion has been exploded by the free use of the sub-soil plow; with this an acre of fair land can be put in good condition for grapes by plowing and sub-soiling both ways, which, if well done, will make a bed of mellow earth fifteen inches deep, at a cost of not more than fifteen dollars per acre. The varieties that promise most success as wine grapes are Concord, Norton's Virginia and Clinton. Concord makes

a fair wine when unmixed with the juice of any other variety, but when mixed in equal quantities with Clinton or Virginia, it is very much improved; for this purpose Clinton will probably be preferred, as it is easy of propagation, while in hardiness and healthiness it is unsurpassed. There is no doubt but Virginia seedling grapes will, for some tastes, make a better wine than Clinton, but it is no better grower or bearer, and is extremely hard to propagate.

It will be seen by the foregoing that, although as much grain may be grown on an acre as in other parts of the State, the peculiar adaptation of our soil and climate for fruit culture would indicate this in the future as the prevailing business of our county, while the abundant summer pasture furnished by our sparsely timbered lands, and the facility with which clover and the cultivated grasses are grown in our fields, show that stock raising should not be neglected, and probably will not be, as these two branches of industry may be united on the same premises and work with mutual benefit.

The emigrant from the North and East will find hardly so good school houses, churches or other social advantages, as in the older parts of the Union; but we have an excellent common school system, and the State has provided ample means for the education of her children. It only requires the active energy of educated and enlightened parents to reap the advantages provided to their hands. The natural tendency of emigration, under the constraining influence of our excellent new Constitution, will improve the society of this part of the State rapidly. No persons come among us now but those of radically loyal tendencies, and none leave but those whose sympathies adhere to the old order of things peculiar to a slave State.

Crawford county has always been loyal to the Government. Many of her people have not been blessed with educational facilities so good as could have been desired, but they are progressive in their tendencies and readily adapt themselves to the improved conditions that surround them. The friends of universal liberty are in the majority, and that majority increases with every election. We shall welcome to our county the intelligent workers from the Northern hive, who will find sympathizing hearts and strong hands ready to give encouragement to all who may select a home among us.

DALLAS COUNTY.

BY A. B. MADDUX, COUNTY CLERK.

GENERAL DESCRIPTION. About one-fourth of the county is beautiful prairie, the remainder timbered, with prairie valleys interspersed.

The Big Niangua river runs nearly north through the entire length of the county, with a number of tributaries. The country for three or four miles each side of the Niangua river is broken, but very well timbered. This river is about forty or fifty yards wide, with a swift current, and has an abundance of water at all seasons of the year to drive any ordinary machinery. Upper Big Spring, in section one, township thirty-four, range eighteen, is one of the largest springs in the State, and has a very considerable fall to its mouth in the Niangua, a distance of about one and a quarter miles. The Sweet Big Spring is about eight miles below, only a little less in size, and runs about half a mile before entering the river. The Brown springs are located five miles north of the Upper Big Spring. The Fowler and Hust springs are in section eight, township thirty-six, range eighteen. All of these springs furnish excellent water power, so that, with the Niangua river, we have the best water power in the State. There is a large quantity of prairie valley and hickory barren lands, and one-fourth of the county is beautiful high prairie, affording a large quantity of arable land adapted to the raising of corn, wheat, rye, oats, timothy and herd's grass, and as fine fruit lands as any in the world, especially apples, peaches, pears, plums and the grape.

TIMBER. Post oak, black and white walnut, black and white oak, blue and white ash, coffee bean, sycamore, elm, hickory, black and white, also white grapes in abundance, strawberries, wild plums, wild cherries, etc.

LANDS. There is a large quantity of Government land in the county, I presume one-third of the county, affording a fine chance to procure homesteads under the act of Congress approved May 20, 1862. About fifteen thousand acres have been so taken up in the months of March, April and May. Lands are low in this county. Improved lands will not average above five dollars per acre; unimproved lands, about one dollar and fifty cents to two dollars per acre. No lands in this county belong to any company or corporation, that I am aware of, though ten or fifteen thousand acres are owned by non-residents.

MINERALS. There is a kind of limestone or mixture of lime and sand, sandstone and a kind of stone (I do not know the name of it,) of a bluish white color, without any grit, dresses very smooth and receives a beautiful polish. Some cannel coal has been found, but not yet worked. Lead is found in the valleys in various portions of the county; it is picked up on the borders of the streams. No attempts at mining have been made.

MILLS. There are several corn mills, and but one flouring mill of any note; it is located on Big Spring.

IMPLEMENTS. There are no manufactories of implements except plows, hoes, wagons, etc.

No agricultural societies in the county.

There are forty thousand nine hundred and twenty-three acres of im-

proved lands in the county, and two hundred and eighty-nine thousand three hundred and seventeen of unimproved.

The population is about five thousand.

The principal productions are corn, wheat and oats, timothy, Hungarian and some other grasses. Stock raising is carried on to a considerable extent.

I have been engaged in farming in this county ten or twelve years, and I believe that fifteen bushels to the acre was my smallest yield of wheat, and as high as fifty bushels is not an uncommon yield. There are in the county seventy-five thousand acres of wheat lands. The best are the hickory barrens and hazel lands; these are well adapted to winter wheat—as good for this purpose as I ever saw. Only a small portion of these lands is as yet cultivated. Very little spring wheat is raised, the principal dependence being winter wheat, which is a very sure crop. Wheat drills and sub-soil plows are unknown. Underdraining has never been tried. The aggregate of productions I am unable to give, as I have not sufficient data.

CORN is cultivated to a considerable extent; the average yield is from thirty-five to forty bushels to the acre. About four hundred thousand bushels are raised in the county.

RYE, OATS, BUCKWHEAT AND POTATOES are cultivated to a limited extent, and yield very well.

HEMP AND FLAX are raised in small quantities.

COTTON. Since the war the high prices obtained have caused this article to be grown in considerable quantities. One of my neighbors planted an acre, from which he picked one thousand pounds of seed cotton.

TOBACCO is raised in small quantities for home consumption.

SHEEP are kept in small flocks, but how many I am unable to say, nor if any are exported.

Some attention is paid to the cultivation of hay, the yield of which is from one and a half to two and a half tons per acre.

HEDGES have been tried to a limited extent; the principal plant used is the *bois d'arc*, or Osage orange; it never winter-kills, and with good care soon makes a good fence. But we have so much good timber for making rails that there is small inducement to make hedges.

CATTLE. Large numbers of cattle are annually driven to market, but how many I am unable to state.

FRUIT. Considerable attention is being paid to the cultivation of apples, peaches, plums, etc. I believe Southwest Missouri is the best portion in the State, and Dallas county is the best in the Southwest for this purpose. The best and finest apples I have ever seen were raised in Dallas and Hickory counties.

To conclude, Dallas county has better water power and more of it than any other county in the State; is the best fruit and grain-growing county, and better adapted to grass than any of the surrounding

counties; a fine stock-raising country; good corn lands and wheat lands; a fine climate, pure water, and one of the most healthy localities in the West. With our resources almost entirely undeveloped, this county offers rare inducements to the industrious and thrifty emigrant, as well as the merchant or manufacturer. And last, but not least, Dallas county has been truly loyal from the first. In June, 1861, we raised seven hundred and fifty home guards in ten days, out of a voting population of not exceeding eight hundred. A large number of these enlisted in the United States army for three years. We claim that our people are as loyal as any in the United States.

BUFFALO, July 18, 1865.

TOPOGRAPHY OF FRANKLIN COUNTY.

BY HON. GERT. GOEBEL.

It is not an easy task to give a full and explicit description of the topography of this county, as it combines within its eight or nine hundred square miles nearly every advantage and facility which will invite and encourage farmers and manufacturers, laborers, capitalists and mechanics to make this county their future homestead. The county has now some fifteen or eighteen thousand inhabitants; but, whenever the popolation will be swelled to the number of one hundred or one hundred and fifty thousand, these people will live with more ease, and in more comfort than the present settlers. If justice is to be done to this county, if no part of it shall be neglected or slighted, it requires, perhaps, more space in the Agricultural Report than may be, with propriety, allotted to only one county; but its surface, the various soils, the great varieties of its timbers and the abundance of minerals make a somewhat lengthy report an almost unavoidable necessity.

The county is bounded on the north by the Missouri river, on the east and southeast by St. Louis and Jefferson counties, on the south by Washington county, and on the west by Gasconade county.

Near the northeast corner of the county, Big Tavern creek runs into the Missouri river. The stream is small and affords but little running water; but many good springs are in the valley. The bottoms are narrow, but very fertile; the adjoining hills are mostly very steep, but densely wooded. A few miles farther west, the Ridenour creek empties into the Missouri. It is larger and longer than Tavern creek, but its character is the same; rich but not wide bottoms, and steep and heavy wooded hills. Higher up, the Labadie creek enters the Missouri. This creek is, though without justifying the erection of mills on it, much longer than the two already mentioned. After

leaving the creek, the hills are not very abrupt, many of them gradually sloped and tillable to the top, also studded with heavy timber. The Missouri bluffs, south of Labadie bottom, having receded from the river some two or three miles, approach the river again near the mouth of Du Bois creek. The lands on this creek are hilly, but are the best of uplands and well timbered. Some three miles above Du Bois creek, St. Johns creek comes into the Missouri. This creek runs through the county in a northeasterly direction, for some twenty miles, but does not afford much water for manufacturing purposes; but the bottoms, as well as the hill-lands are mostly very desirable for farmers. The lands on the headwaters are poorer and often rocky, but by the industry and perseverance of the settlers, mostly Germans, even on these comparatively poor lands abundant crops are harvested. The lands on some of the tributaries of this creek are barren, and very sparsely timbered, but on all lands, not strictly barrens, timber is plenty. Some eight miles above St. Johns, a larger stream, Bœuf creek, empties into the Missouri. This stream runs almost in a parallel course with the former one; the current is most too sluggish to encourage mill building, but the bottoms, as well as the hill-land, on the main creek, are nearly all of great fertility, well timbered and easily cultivated, and only the hills on the headwaters of its tributaries become too broken, rocky and sterile for cultivation; but even on these poor hills, many selections may be made for growing fruits and grasses. The head-waters of the main creek are in Gasconade county.

Still higher up, towards the western county line, Big and Little Berger creeks, joining a few miles above the mouth, enter the Missouri river. These creeks are small, and have, as regards soil and timber, the same character as the water courses heretofore mentioned. Their head-waters are more barreny than those of the other creeks, but these so-called barren hollows are in most instances very productive, especially for all sorts of small grains.

Just north of these two creeks, that famous Berger bottom, from one to five miles wide, spreads to the banks of the Missouri. Its fertility cannot be excelled, and in the course of time it may become the great garden of the county.

Some twenty years ago this bottom was, with the exception of some fields near the banks of the river, an almost unbroken and unpenetrable wilderness; but where tall and gigantic cotton trees were towering into the air then, wide fields of the most luxuriant corn present themselves to the eye everywhere, and roads and lanes traverse this bottom in every direction.

The south part of the county is watered by one of the most beautiful streams in the State, the Meramec. This stream, in coming into the county, crosses the line between Franklin and Crawford counties, and, running in a northeasterly direction, enters St. Louis county near Pacific City, and is accessible for small steamboats. The water of the

stream is very clear, and the current so swift that at every second or third shoal, mills or establishments of any kind, requiring water power, may be erected. The bottoms are wide and very productive, and also heavily timbered with the most valuable kinds; but these lands are sometimes subject to overflowing. The bluffs and hills commanding the Meramec valley are higher, and often very rugged and broken, a great deal more so than the hills on the streams running into the Missouri. The landscape and the scenery is often singularly impressive on the beholder. It is at the same time lovely, picturesque and romantic.

The principal tributaries south of the Meramec are Calway creek and the Little Meramec. The bottom lands on either of these creeks are inexhaustibly rich, and the hill-lands, especially on the Little Meramec, are good and desirable farming lands, almost to the extreme head of it. On these creeks there is a sufficiency, but not a superabundance of timber.

Rye creek and Indian creek come into the Meramec higher up. The bottoms are not very wide, but contain good arable land. The hills are mostly rugged, flinty and not fit for cultivation. On the headwaters of Indian creek is the only pine timber in the county worth noticing.

Some twelve or fifteen miles west of Pacific City the Bourboise river joins water with the Meramec. The stream is not quite as large as the Meramec, but, though it has not as much fall as the Meramec, still affords water power enough for mills and manufactories. The bottoms, as well as the hills and table lands, are very much of the same quality as those on the Meramec; the bottoms are also, sometimes, subject to inundations. Among the many tributaries of the Bourboise, Spring creek is perhaps one of the most remarkable. The whole valley of the creek abounds with springs of the best water, and one of these springs, not more than about six miles above the mouth of the creek, affords sufficient water power for any manufacturing establishment. The valleys along the main creek and along the many little rivulets running into it, are not grown up with underbrush and timber, but present little beautiful prairie valleys of great depth of good, rich alluvial soil. The hills bounding these valleys are broken and stony, but on the dividing ridge, between Spring creek and the Meramec, a large and extensive scope of rich table lands invite the enterprising farmer to settle, and abundant harvests will remunerate his industry. Clear prairies are but few in the county; the most of them are in cultivation, and the remainder is growing up in brush.

Franklin county has many well experienced farmers, but, perhaps, very few who have enjoyed a thorough scientific education; therefore their judgment of the quality of lands is not based upon the result of chemical investigations, but upon the kind, quality and size of timber and underbrush growing on lands; and such observations are to the

experienced farmer reliable indications of the kind, depth and quality of the sub-soil.

On the rich, sandy, alluvial Missouri bottoms the stately cotton trees are predominant, also elm, sycamore, hackberry, walnut, cherry, burr oak, box elder, ash, hickory, coffeenut, buckeye, and, now and then, a sassafras tree, some two or three feet in diameter, is found. The underbrush mostly consists of pawpaw, spicewood and water dogwood. In the creek bottoms all these timbers are found, with the exception of the large cotton trees. Lynn, white oak, black oak and Spanish oak are also found in these bottoms, and, along the creek banks, maple and willows. In the Meramec and Bourboise bottoms, clusters of very large gum trees are found. On the hills, near the bottoms, all sorts of oaks and also sugar maple and hickory are predominant, and the underbrush are dogwood, redbud, sassafras, red and black haws, briddly ash, persimmons and all kinds of young trees, from the size of a switch to the size of a sapling. Pin oak, burr oak and swamp oak are chiefly found in all wet bottoms and on all lands of a stiff and clayey sub-soil. More remote from the water-courses, on the higher, dryer and less productive lands, the post oak and white oak have the supremacy, and scrubby post oak and black jack are the only ornaments on the flinty, untillable hills of all head-waters.

GASCONADE COUNTY.

REPORT FOR 1864.

HERMANN, December 6, 1864.

To the Missouri State Board of Agriculture:

GENTLEMEN: In compliance with an act of the Missouri State Legislature, approved December 1st, 1863, the Gasconade County Agricultural Association, by the undersigned, begs leave to submit the following brief report:

The association was chartered on the 30th day of January, 1857, and has, since its organization, held nine annual fairs, at each of which the average sum of one hundred and fifty dollars has been distributed for premiums. Every one of these yearly exhibitions, which, so far, have been the only means by which the society could promote its cause of encouraging agricultural improvements, has shown an increase in numbers and perfection of the articles exhibited, and of the very gratifying interest manifested by the participants and the outside public. The association counts about one hundred members, who each contribute a monthly fee of ten cents. These fees, with a few

hundred dollars received from the State, and small donations collected from individuals, as occasions demanded, were the only funds out of which the society has paid its premiums, and, furthermore, purchased a fair ground of six acres, four acres of which are fenced in and adorned with shade and ornamental shrubbery and trees. During the present year a substantial brick edifice has been erected on the grounds, at a cost of eighteen hundred dollars, borrowed money. The society depends on the earnings of future fairs to repay this sum. Until now, in consequence of the want of proper accommodations, the proceeds of the fairs were so trifling that they were barely sufficient to meet the expenses.

The staple commodities of our county are native wines, orchard fruits, wheat, barley and corn. Owing to the short notice received for furnishing this report, I am not enabled to state the prices and quantities produced of these staples, but take pleasure to refer for further information to the worthy president of our society, Mr. Geo. Husmann, who will be present at your meeting, and who is known to you as an acknowledged authority on horticultural and agricultural matters, and to whom, in connection with these remarks, I must pay the well-deserved compliment that the existence and success of our society are principally due to the untiring energy and unselfish liberality which, under all circumstances, he freely exerted in behalf of its welfare.

It may be in place to state that the membership of the society does not extend beyond a few miles from town, thus keeping within the horticultural region of the county. A majority of the members follow horticultural pursuits. This fact accounts for the principally horticultural nature of our fairs. The farmers in the interior of the county as yet have failed to coöperate with us. If they could be brought to a sense of their duty, we might achieve better results.

Leaving all other subjects which might here be transgressed upon to the verbal communication of our president, who can do them fuller justice than any efforts of mine, I herewith close this imperfect report, and remain, Very respectfully, your obedient servant,

WM. WESSELHOFT.

REPORT FOR 1865.

Gasconade county is situated on the south side of the Missouri river. Its boundaries are the Missouri on the north, Franklin county on the east, Crawford county south, and the counties of Maries and Osage west. It is connected with St. Louis by the Missouri and Mississippi rivers—distance, one hundred and twenty miles; and by the Pacific Railroad—distance, eighty miles. Its principal town is Hermann,

on the river and Pacific Railroad—a thriving village of about fifteen hundred inhabitants. General character of soil, hilly and broken; soil, light sandy loam; limestone is the principal formation on the south and west sides of the hills, with sandstone on the northern slopes. Its rivers are the Gasconade; width, about four hundred feet; depth, about three feet; force of current, about three miles an hour. The Burbois, one hundred and fifty feet wide; depth, two and one-half feet; force of current, three miles an hour. Both are available for water power. Creeks are not durable, becoming dry a part of the summer. Springs are very numerous, affording good, clear, hard water.

TIMBER TREES. White oak, black oak, burr oak, post oak, pin oak, red oak and many other varieties of oak, black and white hickory, several varieties of maple and elm, sycamore, black and white walnut, hackberry, cottonwood, mulberry, buckeye, redbud, dogwood, sassafras, locust, ash, birch and linden. The county is abundantly timbered.

Of wild fruits we find the persimmon, plum, cherry, mulberry, blackberry, dewberry, grape, raspberry, service berry, pawpaw, gooseberry, strawberry, huckleberry, crab apple, black and red haw, hackberry, etc. Of wild shrubs, several kinds of spirea, bladder senna, spicewood, a deciduous variety of holly, hypericum and many others. Of vines and creepers, a great variety of grape vines, bignonia radicans, American staff tree, clematis, Virginia creeper, etc.

There are about one thousand acres of Government lands, mostly of little value. Average value of improved farms, fifteen dollars per acre; average price of unimproved lands, five dollars per acre.

THE MINERALS are sandstone, lime and freestone, flint, coal in Red Oak creek, township forty-two, range four, eighteen feet thick, near the surface; not worked to any extent; iron on Gasconade river; lead on Burbois river; both not worked. No indications of coal oil; no experiments made in boring for it.

MILLS. Seven flouring mills, seven saw mills and two woolen factories are in active operation.

AGRICULTURAL IMPLEMENTS. But a limited number of reaping, threshing and mowing machines are used, owing to the uneven character of the land. Cider and grape mills and presses of many kinds, plows, harrows and the usual farming implements are in use; also, seed drills of several patents. Plows and wagons are manufactured to a considerable extent in the county.

AN AGRICULTURAL SOCIETY has been in active operation for ten years, and is one of the oldest in the State. It was organized about ten years ago, and among those who were its earliest and most active members may be named the following: William Kielmann, William Wesselhoft, Michael Poeschel, William Poeschel, George Husmann, Matthias Wüthrich, J. Giedler, F. G. Kuhn, Frederick Noe. Its present officers are George Husmann, President; John Schmidt, Vice President; John Scherer, Secretary; William Kielmann, Treasurer. The

society has held nine annual exhibitions, which have contributed very much to develop the taste for horticulture; and, although its means are small, this has been the only agricultural society in the State which has kept up its exhibitions during the late war. They are mostly of a horticultural character, as there is but little stock raised in the county; but the Hermann fruits, grapes and wine are becoming justly celebrated. The Hermann fairs are generally a jovial and merry gathering of all the lovers of pomology, and especially grape growing, throughout the State, and even draw many of the same class from other States. Grain and vegetables are also generally well represented, and the ladies also contribute their share of tasteful specimens of embroidery, needle and shell work. The society owns six acres of land in the corporation of Hermann, which is fenced and planted with trees and shrubbery, and on which a substantial brick exhibition hall was erected in 1864, at a cost of about two thousand dollars.

About one-ninth of the land in the county is cultivated, and it numbers about nine thousand inhabitants. The principal productions are grapes and wine, fruit, barley, corn, wheat, oats, rye, potatoes, buckwheat and tobacco.

WHEAT. The average yield among the best farmers is about twenty bushels per acre; average in the county, twelve bushels. Fall wheat is generally cultivated. Sub-soil plowing is practiced but little, although the results have been good wherever tried. The drill is used but little, and under-draining is not followed. Aggregate amount raised in the county, sixty thousand bushels.

CORN. Average yield per acre, forty bushels, mostly the large white and yellow varieties. The yellow is considered best for stock. It is generally fed dry, and but little of it marketed, but used for fattening hogs and cattle. Aggregate amount raised in the county, one hundred and fifty thousand bushels.

OATS. Average yield, twenty-five bushels to the acre.

BARLEY. Average yield, thirty-three bushels to the acre; aggregate raised, seventy-thousand bushels; mostly sold to St. Louis brewers, where it is preferred to that of almost every other county in the State.

RYE. Average yield, fifteen bushels per acre.

BUCKWHEAT. Average yield, twenty bushels per acre.

POTATOES. Average yield, seventy bushels to the acre; quality, very fine.

SORGHUM has been cultivated to some extent, and every farmer, almost, makes his own molasses. Average yield, three barrels to the acre. No sugar has been made from it. The common mills, which press at the same time, are used to crush the cane, and the juice is boiled in common kettles.

HEMP is cultivated very little.

FLAX. Cultivated some, for home use. Average yield not known.

COTTON has been raised but little, but with fair success.

TOBACCO is raised successfully, but not to a great extent. Average yield, six hundred and fifty pounds to the acre.

SHEEP. The county is well adapted to wool growing, but no large flocks are as yet kept; mostly common stock, and the wool used for home manufacture.

HAY AND TAME GRASSES are cultivated to some extent, mostly timothy, clover and some herd and blue grass, for pasturage. Average yield, one ton per acre.

Hedges of the Osage orange are planted to some extent, especially in and around Hermann, and, where well attended to, with very good success, making an excellent and durable hedge, in about four years from the planting. They are perfectly hardy.

HOGS are mostly marketed in Hermann and vicinity; average, about two thousand per year; average weight, two hundred pounds; generally common breeds.

CATTLE marketed in the county, about one thousand per year; aggregate number in the county, twelve thousand, of all ages; mostly common stock.

MULES AND ASSES. About five hundred are raised annually. Average price, one hundred and fifty dollars.

FRUIT. This is one of the best fruit growing counties in the State, and almost every farmer has a good orchard. Apples, pears, peaches, cherries and grapes succeed admirably, and, in some localities, where the curculio is not troublesome, plums, apricots and nectarines. All the small fruits succeed well. Although there is, at present, only one firm of professional fruit growers and nurserymen, Husmann and Manwaring, there are many others who raise quite an amount of fruit to sell. The peach crop of the county, the last summer, may have been about ten thousand bushels, of which about five thousand were marketed green, at an average price of seventy-five cents per bushel. Of apples, there may have been grown in the county about twenty thousand bushels, of which about eight thousand may have been marketed green, at an average price of sixty cents per bushel, and about five thousand bushels made into cider. Average price per barrel of cider, twelve dollars. Of pears, there may have been about one thousand bushels marketed green, at an average price of one dollar and fifty cents per bushel; cherries, plums and apricots, about two hundred bushels, at an average of four dollars per bushel. Small fruits are generally raised only for home consumption.

VINEYARDS. This is one of the leading branches of industry in the county. There are now nearly a thousand acres planted in grapes, of which about four hundred may be in bearing condition now. Unfortunately, nearly all the old vineyards are planted with the Catawba, which is very uncertain, and, in this season, almost an entire failure, the average crop being only about seventy-five gallons to the acre. Most of the latter planting has been done with the Norton's Virginia and Concord, which are a sure crop every year. Of the Norton's

Virginia, the average crop may have been about six hundred gallons per acre, and the average crop of the Concord one thousand gallons per acre. The Herbemont is also cultivated to some extent, and has yielded a very heavy crop; to the best of my knowledge, about eight hundred gallons to the acre. Among the varieties promising well, but which are as yet not extensively cultivated, are the Cunningham, Clinton, Hartford Prolific, Taylor, Cynthiana, Arkansas, Rulander, Martha, Cassady, North Carolina Seedling, Roger's Hybrid, No. 1, and, in some locations, the Delaware. The results of this summer will sum up about as follow:

Grapes marketed, mostly Concord, 20,000 pounds, at an average price of fifteen cents per pound	$ 3,000
Catawba wine made, about 25,000 gallons, average value, $1.50	37,500
Norton's Virginia wine made, about 10,000 gallons, average value, $4	40,000
Concord wine made, about 5,000 gallons, average value, $2.50	12,500
Herbemont wine made, about 1,000 gallons, average value, $3	3,000
Other varieties made, about 1,000 gallons, average value, $3	3,000
Grape roots, cuttings, etc., grown and sold	50,000
Total	$149,000

This is, of course, only a rough estimate, but it is, I think, rather below the actual value than beyond it. I believe that it will come nearer to the sum of one hundred and seventy-five thousand dollars, all in all, than to the sum put down, but do not intend to go above the actual value. The average yield per acre of leading varieties may be put down as follows, one season with the other, under fair treatment:

Catawba, per acre	250 gallons.
Norton's Virginia, per acre	700 gallons.
Concord, per acre	1,200 gallons.
Herbemont, per acre	1,000 gallons.
Clinton, per acre	1,000 gallons.

Among the principal grape growers, I will name the following: Michael Poeschel, William Poeschel, Melchior Poeschel, Joseph Spirg, George Husmann, Francis Langendoerfer, Jacob Rommell, Jacob Kuhn, Frederick Noe, Francis Rippstein, Tovias Glaser, Bernhard Petrus, George Mueller, Daniel Streker, Constance Rick, G. Ackermann, Dr. E. Kaengy and Wm. Nichels.

In conclusion, I would here remark, that the prospects of the agricultural interests of the county, but especially for grape growing, have never been more bright than at the present moment. Whatever the farmer may produce finds a ready market, at remunerating prices, and this should encourage us to renewed exertions in the good work. The farmer in our county has every reason to be contented; and, although we may not have many who are very wealthy, we may justly say that we have among us not one, who is willing to work intelligently, who is not in easy circumstances. Our farmers know poverty only by its name. But when we examine into the prospects of grape growing, we find that branch of industry more remunerative than any

other. Our wines, especially the Norton's Virginia and Concord, of Hermann, have a reputation extending over the whole Union; nay, even into Europe. They are a sure crop every year, and will grow on thousands of acres which are yet covered with forest, and which formerly yielded nothing, and were thought to be unfit for cultivation. A few acres, well planted with these reliable varieties, and well cultivated, will make a man independent for life. This is the branch of industry in which our county can and should excel. Let us go to work, then, and make our rugged hillsides smile with plenty. We have a climate and soil here more favorable than the best locations on the Rhine. Ours be the task to transform the banks of the Missouri into the Rhine of America. Let us fulfil it earnestly and well, for we are freemen on free soil, and, as such, we should work freely and willingly.

In submitting the above report to your honorable board, I beg leave to state that I am much indebted to the zeal and kindness of our worthy county assessor, Henry G. Gentner, for valuable information and statistics compiled by him.

Yours, respectfully,

GEORGE HUSMANN,

President Gasconade County Agricultural Association.

DR. L. D. MORSE,

Corresponding Secretary State Board of Agriculture.

HENRY COUNTY.

BY L. C. MARVIN, CLINTON.

This county is gently undulating in its surface, abounding in rolling prairie, with little timber, except along the banks of its streams. The soil is generally what is termed limestone, or alluvial of great depth and productiveness. The southeastern portion, however, where it approaches the Osage river, inclines more to what we call sandstone, On the whole, we know of no one who has made himself acquainted with its locality and peculiarities, but considers Henry county a healthy, productive and valuable county.

There is but one stream of water in our county which we dignify with the title of river. South Grand river enters the northwest portion of the county and leaves it on the southeast. Its width is about eighty yards, and about twenty feet deep when full. For a stream in this western country, its force of current is full average, and within the bounds of the county there are and have been some five grist and saw mills upon its banks, capable, most of the year, of doing a

tolerably thriving business. Of creeks, we have Tebo, Deep Water, White Oak, Big creek, Bear creek and Honey creek. One or two of these afford sufficient water for mill purposes, and large bodies of fine timber grow upon their banks. The water of this section of the country is generally hard, though there are springs which afford water sufficiently soft for washing purposes; but the tendency is otherwise.

TIMBER. The prevailing species of timber is the oak. All the varieties of this tree are found in greater or less abundance, but the white oak is probably more prevalent than any other. We have, also, black walnut in abundance, ash, hickory, elm, maple, linn or basswood, pecan, locust, sycamore and perhaps others. Our shrubs and wild fruits consist mostly of the wild plum, pawpaw, persimmons, blackberries, strawberries, grapes, crab apples, hazel, redbud, black and red haws, and probably others less common. Beside the grape vine, which largely abounds in our forests, and yields a very passable fall fruit, we have the ivy, honeysuckle, bittersweet, wild cucumber, pea vine, and several other "creeping things," for which I know no name. Timber has generally been considered scarce, but our coal largely compensates for the seeming deficit in that direction, by furnishing plenty of fuel, and our timber is increasing rather than diminishing within the bounds of the county.

LANDS. We have no Government lands, the last acre having been sold before the war. No corporations own land in this county, though a large number of acres are owned by non-residents; but it is not believed that they hold their lands at exhorbitant prices. It is difficult to estimate the price of land in this region. Prices are controlled by the amount sold, amount of timber, extent of improvements, location, etc., etc. It cannot be very wide of the truth to say that improved lands range in price from seven dollars to twelve dollars and fifty cents per acre. The tendency from these figures is decidedly upward. Unimproved lands have a probable range from three dollars to five dollars per acre, and more where timber and prairie can be bought adjoining.

MINERALS. Limestone is the prevailing rock, with sandstone at intervals, and in certain localities. Then we have cotton rock, fire rock, and occasionally flint. Bituminous coal largely abounds. A great number of veins have been opened, and supply a large per centage of our winter fuel. It is of good quality and easily obtained. The thickness of the various strata varies from twelve to thirty-six inches. It is frequently dug from the sides of ravines and creeks, and not very deeply bedded in the earth. Query: Is coal a mineral? There are indications of iron in one or two sections, but no effort to work the ore has ever been made. It is understood that there are strong indications of coal oil in one or two places, but no movement has been made to bring it to the surface.

MILLS. We have none of what would be properly termed flouring mills. We have a plenty of steam and water mills for grinding corn,

and a portion of them make from good wheat an indifferent article of flour. We are in great need of the proper mills for making good flour.

IMPLEMENTS. Reapers and mowers of the best patterns are universally in use. The scythe for grass, and the cradle for grain, are now reckoned as things which had their origin in a comparatively barbarous age, and the more so, perhaps, as there is no negro muscle in the market. To Him be the praise. There are no establishments in the county for manufacturing these machines, and the height of our ambition is to make a goodly portion of our own plows. Of these we get up a very good article, and a large per cent. of what we use.

AGRICULTULAL SOCIETIES. Before the war there was a very respectable society for the promotion of agriculture and the mechanic arts, formed about the year 1858, and had two annual exhibitions, very creditable to the citizens, both for the number and quality of articles exhibited. If we could have continued as we began, there can be no doubt that the generous and friendly rivalry which was stimulated, and the personal acquaintance and friendship which was cultivated, would have led to very excellent results to our farming population, and benefited our community generally. Among the projectors and early friends of the society were Joseph Davis, Joshua Swinney, A. M. Tutt, R. Allen, A. C. Marvin, John A. Rogers, A. C. Legg, James Hogan, Major Good and others, many of whom remain unto this day, but some are fallen asleep. At present, the society has not even a nominal existence.

POPULATION AND PRODUCTIONS. Our county has been greatly depopulated during the late war, and no certain data can be had upon which to base an estimate of the number of people. Those who left, of the living, are fast returning, and the present indications are that in another year we shall obtain our former number. As some facts pertaining to us in 1860 may help to estimate correctly our future, it may be stated that in the said year this county polled over one thousand seven hundred votes, which, for a comparatively new one, augurs favorably for her resources and future developments. The whole white population in that year was said to be eight thousand six hundred and twenty. We will soon have that number again, if appearances at present are not deceptive. The great staple production of this county is corn.

WHEAT. To no great extent has wheat ever been sown here. There is a prospect, however, that more attention will be paid to this crop in the future than has been in the past. Care has not been taken to put in the seed in the right manner and at the right time, and, as a consequence, it has not been considered a safe crop. From ten to twenty bushels per acre will probably describe our wheat crop. It does far better when put in with a drill than when sown broadcast, and in the future, I think, the latter method will be discarded altogether. No data can be found on which to base an estimate of the

quantity raised. There has been no sub-soiling or under-draining in the county that I am aware of.

CORN. As stated above, this cereal is the largest and most important of all the products raised in this region of country. The kind known as the gourd seed is usually considered the most profitable for common use, although the large yellow is thought by some farmers to be preferable for feeding stock. The usual manner of feeding corn is to cut and shock in the field the latter part of September, and haul it out as you need it during the winter to the feeding lot. For feeding store cattle, the corn may be husked and taken to the crib as time and opportunity offer, and only the stalks and husks used for feeding. We have no other market for corn but to feed it to the various domestic animals, and drive those to the best market within our reach. In the present condition of things here, no method is known by which to give a true estimate of the amount being raised in the county. Our crop, however, is good, and we have double the number of acres planted which were planted last year. With our present system of imperfect cultivation, it is claimed that the average crop is about forty bushels per acre.

RYE. There has never been a crop of this grain raised here. A few patches about the county may have been seen in years past, but nothing has been done by which we can arrive at correct conclusions, except, so far as tried, it seems to grow and do well, and what is here stated relative to rye is equally true of barley. Very little or none is raised, and it is not a crop in this section.

OATS. This grain is more extensively sown than any other, because farmers have come to the conclusion that for feeding stock it is, all things considered, the most profitable of the small grains for that purpose. Of this, however, there may be a reasonable doubt. When sown early, it usually makes a large yield. It is generally fed to stock in the bundle—a wasteful and thriftless procedure. The average yield, from what is known of the matter, may be put down somewhere in the neighbohood of thirty bushels per acre.

BUCKWHEAT. All that can be said of this grain is, that some farmers usually sow a small quantity, sufficient to furnish cakes in winter for themselves, and pehaps a little to share for a neighbor or two. It is not known the amount per acre which it produces, although it appears to grow well.

POTATOES. This product has never been planted in this county to any great extent, a patch in the garden being the limit. There seems, however, this year to be an unusual amount planted, and from all accounts, a large quantity will be raised. The various kinds which you find in the St. Louis market are planted here. It is said that potatoes which are brought from the North do far better for seed than those raised here, more vigorous in their growth and less liable to disease. It is impossible to give the amount per acre. No reason is known, however, why this crop may not be as successfully grown here as in

other sections of the country, notwithstanding a tendency at times to make more top than bottom. This evil, however, it is supposed, may be remedied.

SORGHUM. When this was first introduced in this section of country, it was looked upon with suspicion and distrust; but it has won the day, and all classes look upon it with decided favor, and the quantity is yearly increasing. The amount planted this year is much larger than in any previous, and it has a fine appearance and promises a large yield. Any land which is suitable for corn is adapted to the sorghum. Like corn, the better the soil and cultivation the better the crop. It is claimed that one hundred, and as high as one hundred and fifty gallons of molasses are produced from one acre of ground. The quality of the molasses is in accordance with the skill and care exercised in the manufacturing process. No sugur has been made from it, although, where it is well made, the granulating process goes on slowly as it attains age, and a large sediment of sugar is often found at the bottom of casks when it has been stored during the year. It saves to the laboring class a large yearly expenditure for sweetening purposes.

HEMP, FLAX, COTTON. The products here enumerated are not cultivated to an extent sufficient for furnishing any reliable data relative to the success or value of the crop. In passing through the various sections of the county, an occasional area of diminutive dimensions will greet the traveler, where the proprietor has sown a few square rods of one or the other of these lint-bearing plants, with a view to the warp of his winter jeans, or a linen towel, or a pair of shirts or breeches for the heat of summer. They have "this extent, no more."

TOBACCO. The raising of tobacco in this county has not been sufficiently extensive to furnish any statistics worth recording. Occasionally during the past years a crop of an acre or two has been marketed, and with profit to the producer. Nothing appears in the way of raising excellent qualities and a fair quantity to the acre, if farmers should see fit to embark in that kind of enterprise; but, like cotton, flax, etc., this plant has never been cultivated, except incidentally rather than with system, and hence it must be left as we leave them.

SHEEP. There are flocks of sheep varying in number from twenty-five to fifty, owned by farmers in the different sections of the county, principally for the sake of the wool for home use, and to supply occasionally mutton for their own tables. Natives, with an intermixture of the merino, comprise the general character of our sheep. There are no large flocks in this region, but it is believed that no kind of stock pays the farmer better than this; they are uniformly healthy, and it is not known that any disease of any species has ever appeared within our boundaries; they find pasturage upon the prairies in summer, and roam at will over the same area in winter, whenever the weather is not stormy and the ground is bare and dry; little care is taken of them, except to protect them from the hundreds of worse than use-

less dogs which are permitted to curse with their useless presence every portion of the State. I would vote to-day to tax every dog in the State the sum of five dollars per head, and should think it one of the noteworthy acts of my life. How people that refuse to tax dogs to educate children can lay claim to any degree of civilization above Patagonians, I leave for others to decide. On the whole, if a farmer wishes to embark largely in the sheep business, it is my opinion that few better openings are presented than in this and adjacent counties.

HAY AND TAME GRASSES. Our natural resources for grass are so great that but little has been done in cultivation of the tame grasses. Whenever meadows have been made, timothy is the prevailing grass sown. Our pastures are simply sections of prairie fenced around, not for the sake of the grass, but for the purpose of securing animals within reach when needed for domestic or daily purposes. No instance is known where land has been seeded with any of the tame grasses simply for purposes of pasturage. When timothy has been sown and care has been taken of it, the yield has averaged three tons per acre, or thereabouts; prairie grass yields about one and one-half tons of hay to the acre, and if cut at the right season and properly secured without getting wet, it makes very good feed for store cattle during winter, but good timothy is preferable.

HEDGES. To no great extent has hedging been tried, though so far as the attempt has been made, the result seems wholly satisfactory. The *bois d'arc*, or Osage orange, is the plant which has been used for the purpose. It grows rapidly, and, if properly cultivated and cared for, soon makes an impenetrable barrier against all kinds of animals. The winters do not injure it, so far as is known here, and the prevailing opinion seems to be that at least it will make a very safe and durable fence, with but little outlay of money. If our extensive prairies are ever fenced and cultivated, it is not seen what cheaper or more durable and effective material can be used than the Osage orange. There are indications of a more extensive use of this material in the future than has been in the past.

HOGS, CATTLE, HORSES. No statistics of the kind here indicated ever having been attempted previous to the war, and the irregularities which prevail now and during the past few years preclude the possibility of giving anything reliable under this head. In general terms, it may be stated that few counties in the State, and none in the Southwest, have been more prolific in producing the kinds of stock above enumerated for market. Men whose judgment is seldom at fault in estimates of this nature, are of the opinion that in 1863–4 as many as 15,000 hogs were fattened and marketed from this county alone. The weight, on an average, it is supposed would be about the same as the average of hogs which find a market at St. Louis. Taking into the account the fact that a bloody and relentless bushwhacking war was carried on within our bounds during that and other years, and the altogether unsettled condition of things generally, with the indica-

tions as above stated, and some estimate may be made of the capacities of our county in a time of profound peace, with none to molest or make us afraid.

Beef cattle in immense numbers were also driven from our county during the first years of the war, and, seemingly, horses and mules enough have been stolen and driven away to outfit an army for the occupation and conquest of the Peninsula. There are various kinds of stock of the improved breeds among us, but the most common is the Durham in the cattle line; and of hogs, the Berkshire is the favorite, with intermixing of other kinds. Durhams do well, but require far more care and better keeping than the natives. Crosses between the Durham and native, with some, are a favorite kind of stock, giving more weight on the one hand, and requiring less care and feed on the other.

No person has ever undertaken to raise stock especially for the dairy. Farmers simply make their own butter, *when they have any*, and, incidentally, a few pounds for the market. There is the commencement of one cheese dairy in the county, belonging to Mr. John Baker, where the cows number about eighty. I think he makes a profitable business in this matter, selling his cheese readily and at high prices. His cows are mostly natives, with a small per centage of Durhams. Considering the prices paid in this region for cheese, and frequently for an inferior article, and the facilities offered for keeping dairies, it is not seen what business could possibly pay better than the manufacture of good cheese for the market. One hindrance seems to be that few people here know the secret of cheese-making.

FRUIT. Considerable attention has been paid to the raising of apples and peaches, both of which do well and repay the farmer a large return for his labor. Almost every farmer, at present, and some in the past, are intent upon raising fruits of the various kinds, and in the future, from present indications, a large increase will be visible. The best winter fruit in all this region is the Genitan, an apple, I believe, unknown in the North, but one of the very best, as conceded on all hands, in this vicinity. There is no difficulty in raising fruit, if the trees are only planted, and a reasonable amount of care is taken of them, and no labor pays the farmer a larger per centage. The oldest fruit raiser and nurseryman in this county is Augustus Dana, of Calhoun. Though not largely employed in the propagation of fruit, it is believed he has done much to introduce good and valuable fruit into the county. Large numbers of fruit trees, just previous to the war, were being introduced from New York and other Eastern and Northern States. It is generally thought, however, that nurseries in this State are to be preferred to those a great distance North or East. Some are of the opinion that trees, by being transplanted so far from home, are apt to change the character of fruit, like a youth who goes far from home is apt to fall into bad company, and in the end contract bad habits.

VINES AND VINEYARDS. There are, properly speaking, no vineyards in the county. There are, however, in many gardens a few vines, rather incidentally or accidentally than with any well defined intention on the part of the planter. The location of the county and the general character and tastes of the people will be apt to preclude much wine making in our midst, probably, for a long time to come. Landholders can make money on a different basis, and more in accordance with what they know of the world and its wants than by the cultivation of the grape. No reason is known why, if properly cared for, pruned and cultivated, the wine-maker might not do as well here as in other localities within the boundaries of the State.

CONCLUSION. Fragmentary and imperfect as the foregoing description of Henry county is, it is perhaps the best that can be had from any reliable data which can be made available at the present time. We are just emerging from a state of utter chaos, but the prospect is that our land, so long laid waste, will soon put on her beautiful garments, and the desert blossom as the rose.

LAWRENCE COUNTY.

BY J. W. BLACK, MT. VERNON.

This county is situated in Southwest Missouri, bounded on the north by Dade, on the east by Greene, Christian and Stone; on the south it is separated from Arkansas by Barry county, and on the west from the Indian Territory by Newton and Jasper counties. The Southwest Branch of the Pacific Railroad runs through the southern part of it. Area, four hundred and four thousand acres; population, about five thousand. Mt. Vernon, the county seat, is in about 37′ 06″ north latitude, and 16′ 30″ west longitude from Washington City. The county is a table land, elevated about one thousand four hundred feet above the Gulf of Mexico, sloping in the northeast north, and in the south and west sloping west.

GENERAL DESCRIPTION. The surface consists of level land (prairie and timbered bottom), undulating or rolling land (prairie and timber), and broken land (timber mostly—flint ridges), excellent for pasture and the grape. About one-fourth of the county is prairie and three-fourths timber. The soil is of three kinds: Black (prairie and timbered bottom), which is of a coarse texture, very durable and the best for corn. Gray, which is of a fine, close, compact texture, best for blue and herd's grass, and moderately good for wheat, corn, oats and buckwheat. Mulatto soil, which is a warm, lively, fertile soil, of a reddish color, early and easily worked, producing the best crops of

small grain and roots—best for wheat and sweet potatoes. The soil in the county is mostly of this kind. The apple, pear and peach do well on all three kinds of soil, producing vigorous, healthy trees, which come into bearing while young, and yielding constant and regular crops of large, excellent fruit. Perhaps the black and mulatto soils are rather the best for all kinds of fruit—the grape (wild) doing best on the flint ridges.

Creeks are durable, being fed by very large, clear, beautiful springs of hard water. These springs constitute an important feature of this county, affording a constant supply of the purest and best water for stock and manufacturing purposes. In several instances, a single spring furnishes available water power.

The following are some, but not all, of the most remarkable springs in the county and their location: At the head of Spring river are three large springs within a few rods of each other, in township twenty-six, range twenty-six, section twenty-one; Cumberland Presbyterian Camp Ground, township twenty-seven, range twenty-six, southwest quarter section thirty-one; Campbell Cowan's Spring, Clear Creek Baptist Camp Ground, township twenty-six, range twenty-eight, section twenty-eight; Daniel Brown's, on Clear creek, township twenty-six, range twenty-nine, section twenty-five; Thomas Polk's near head of Honey creek, township twenty-seven, range twenty-five, section twenty-two; John Williams', on Williams' branch, township twenty-eight, range twenty-six, section thirty-four; John B. Woods', near head of Williams' branch, township twenty-eight, range twenty-six, section thirty-five; near Mt. Vernon, town site (northwest corner), township twenty-eight, range twenty-seven, section twenty-five; John H. Moore's, on Adams' branch, near Spring river, township twenty-eight, range twenty-seven, section twenty-seven; a very large one on Spring river, below Mr. Moore's, township twenty-eight, range twenty-seven, section twenty-eight; Cave Spring, township twenty-eight, range twenty-nine, section twenty five; Michael Williams', near head of Turnback or Lock, township twenty-eight, range twenty-five, section twenty-one; one on Turnback or Lock, township twenty-nine, range twenty-six, section twelve; Elijah Lingo's, on Center creek, township twenty-seven, range twenty-eight, section twenty-one.

The east and northeast part of the county is well supplied with durable springs. Sycamore, Williams' branch, Adams' branch, White Oak and other creeks, afford durable living water. Spring river rises in township twenty-six, range twenty-six, section twenty-one, and runs in a northwest direction through the county, a distance of twenty-five miles, fifty to one hundred feet wide, from three to eight feet deep, and a current of three miles per hour. It furnishes constant and regular water power; being fed by large springs, it is little affected by drouth, freshets or freezing. Center creek, thirty feet wide, two to three feet deep, thirteen miles in length, in this county, affords available water power. Turnback or Lock, thirteen miles in

the county, fifty to seventy-five feet wide, two to six feet deep, and a current of three miles per hour, and affords good water power.

TIMBER TREES. Post oak, black oak, white oak, Spanish oak, black walnut, cherry, black ash and hickory. Black jack oak affords fuel, and, sometimes, lumber. Also, basswood, buckeye, hackberry, sycamore, white and slippery elm, red cedar, sugar maple, mulberry, white walnut and honey locust.

SHRUBS. Hazel, red and black haw, white and black sumach, persimmon, pawpaw, sassafras, dogwood, service berry, spicewood, wild plum, crab apple, burning bush, red bud or Judas tree, prairie rose, thorn, willow, alder and elder.

VINES. Summer, fox, winter and river grapes, plenty; honeysuckle, trumpet creeper and Virginia creeper.

WILD FRUITS. Wild grapes in abundance, and of good quality; persimmon, pawpaw, haw, plum crab apple, currant, mulberry, gooseberry, blackberry, raspberry and strawberry. These berries do fine.

LANDS. About seventy thousand acres of Government land in this county, mostly not first quality for grain, but good for fruit and pasture. About seventy thousand acres of land in this county belong to the Southwest Branch of the Pacific Railroad. On about ten thousand acres of it there are preëmptions, taken before it came into the hands of the road. This is mostly good land. It is every even number section, except section sixteen, which is a school section, within fifteen miles of the line of the railroad. Improved lands are selling as high as twenty dollars per acre; average, ten dollars, and increasing rapidly in value. Unimproved lands average two dollars and a half per acre.

MINERALS. Mountain limestone underlies the greater portion of the county, forming a durable soil. In the northeast and southeast parts of the country, sandstone of the best quality is abundant and easily quarried. No coal. Iron and lead in small quantities. No mines. No experiments for coal oil.

MILLS. On Spring river there are three grist mills and one woolen factory. There were six grist mills before the war, all burned by the rebels. On Honey creek, four mills. On Turnback, four mills, one woolen factory and one cotton gin.

IMPLEMENTS. Easterly's, McCormick's and Manny's reapers and mowers combined are used with good success. A wheat sower and cultivator combined, and patent cider mills of several kinds are used with satisfaction. Steel plows are manufactured at A. J. Durnell's blacksmith shop, in Mt. Vernon, but not enough to supply the demand. There is a good opening here for that trade.

An agricultural society was formed in 1857, and held four annual fairs. A neat fair ground was fenced off, permanently for that purpose, near Mt. Vernon, and did much good by the introduction of improved kinds of stock. It was a good stimulus to the farming interests of the county generally. The war disorganized it. The following

named persons may be addressed on the subject of agriculture, at Mt. Vernon: John B. Woods, John W. Moore, Cyrus Poag, Gallihue H. Moore, David E. Gibson, William D. Garrison, James D. Hillhouse and Judge James Cherry.

About one-twelfth of the land is in cultivation. Population, in 1860, eight thousand. Population in 1864, per census, three thousand nine hundred and twenty-two. This did not include persons in the army at that time, and a great many had left the county in consequence of the war. The present population is estimated at between five and six thousand.

Principal productions are wheat, corn, oats, buckwheat, rye, potatoes, (Irish and sweet,) cotton, flax, tobacco, apples, pears and peaches. The following domestic animals: Mules, horses, cattle, sheep and hogs.

WHEAT is raised throughout the county, yielding, among the best farmers, from twenty-five to thirty bushels per acre. Average in the county about fifteen bushels per acre. Fall wheat is sown. No drills in use. We think they would succeed admirably. No underdraining.

CORN. The present shallow culture of corn yields an average of about forty bushels per acre, but deep culture produces often eighty and one hundred bushels per acre. It is usually husked and fed in the ear to mules, cattle, horses and hogs.

Rye, oats, buckwheat and potatoes do well. The soil is dry and tillable, and well suited to small grain. Have no data by which to estimate the aggregate of these or other crops in the county.

SORGHUM is very generally cultivated for home consumption, which it about supplies. It yields from seventy-five to one hundred gallons per acre of excellent syrup. Good brown sugar is made without the aid of improved apparatus. It may be planted at different times from the first of April to the fifteenth of May, so that it may be manufactured as it becomes ripe. It does best on black bottom soil. The imphee is considered the cleanest variety. Wooden mills and cast iron kettles are the implements used in its manufacture.

No hemp of consequence grown.

But little flax grown, and that for fibre.

COTTON is grown for home consumption, which it does not supply. Does best on sandy or gravelly soil. Usually crops are light and fibre short.

TOBACCO is not grown in large quantities, but little patches are numerous. It grows well and the quality is good. Heavy leaf is cultivated and air-cured. It is not specially impoverishing to the soil.

SHEEP. Have no means at hand of estimating the amount of wool exported. But, although the war drove off and destroyed great numbers of sheep, yet it is known that several hundred pounds were sold at Sedalia and St. Louis. The merino was introduced into the county several years ago, and some of the stock remains, but not in its purity.

The advantages for pasturage are excellent—the ridges being dry and covered with nutritious grass. They are healthier than in most other States, or parts of this State. Few branches of husbandry promises a better return with so small amount of labor as that of wool growing. Winters are mild, and range sufficiently large. Dogs have done some damage, and since the war began, the wolves have been troublesome. The former can and ought to be remedied by proper dog laws; the latter will be remedied as peace resumes her sway.

There is some attention paid to the cultivation of blue grass, timothy and herd grass, with excellent success. Blue grass now grows spontaneously in this county where the land has been in cultivation, or prairie and timber do not interfere.

HAY AND TAME GRASS. Blue and herd grass are sown for pasture and timothy for meadow, yielding two tons and upwards per acre. Tame grass has this advantage, that it grows late in the fall and even in winter, when the prairie grass is withered. Prairie and bottom lands are best for meadow. Hungarian yields from two to three tons per acre.

HEDGES. Osage orange was planted about ten years ago, and is doing well, the only drawbacks being caused by want of proper attention and culture; winters never injure it. Those who have tried it believe it to be the best and cheapest fencing, but not the quickest, requiring four or five years to make a good fence.

HOGS. There is a great scarcity of hogs now; the war has almost annihilated the race in this county. Average weight has been about two hundred pounds. China and Berkshire have been scattered through the county. Gallihue H. and J. W. Moore have introduced Chester Whites.

CATTLE. The Durhams were introduced a few years ago. Cattle have been driven to St. Louis and south to New Orleans. No large dairies, but abundant pasture, and large springs afford facilities for them.

HORSES. The common draught horse is mostly raised, and some attention has been given to increase their size. The saddle horse is being improved in blood, and an active, durable animal is raised. Average price, $125.

MULES. A great many mules were raised previous to 1861, for St. Louis and the Southern market; price about $160, and extra large, often $200 and $250 each.

FRUIT. Orchards are generally being planted and doing well, coming to bearing early. Apples, pears and peaches grow large and are of good flavor. Several have taken pains to cultivate improved varieties of the apple. Peaches are seedlings, but large and well flavored.

The following list of apples was prepared by John B. Wood, who is a person of experience and observation, to whom you may address inquiries concerning fruit.

Summer Apples. Summer Pearmain, No. 1, all things considered,

ripens last of August; Red June, No. 2, all things considered, ripens first of August; Harvest No. 2, all things considered, ripens first of August.

Fall Apples. Bellflower, No. 1, September; Rambo, No. 2, September; trees short lived here from some cause. Buckingham, September; rather new here.

Winter Apples. Kentucky Red, No. 1, early winter, large, showy and popular for market; Royal Red, large, rich flavored; Genitan, good, keeps till February; Little Romanite, good, best long keeper, May; Limber Twig, good, keeps till May; Green Pippin, good, keeps till March.

No vineyards in the county, but the abundance and good quality of the wild grapes growing spontaneously in the county would seem to indicate that this is one of the best locations for wine growing in the State. A number of us intend to make a small beginning next season, with two or three varieties best adapted to the soil and climate.

This county is adapted to mixed farming, grain, fruit and stock, the soil and climate being favorable to each. The mildness of the winters makes it particularly suited to raising stock of all kinds. The soil produces the finest wheat and the best of fruits, apples, pears, peaches, plums and small fruits, such as berries. The climate, in point of health, is equal, perhaps, to any in the United States, particularly beneficial in pulmonary diseases.

In point of education we think this county is in advance of any others in the Southwest. It had sixty schools before the war, with an attendance of from three to thirty per cent. of the number of children enrolled, more than in any of the adjoining counties.

The Presbyterians had five churches before the war; four now. Baptists nearly the same. Methodists two or three, and some other denominations doing well.

To all in favor of free institutions, we say, come and settle among us, and welcome, but don't expect to find a paradise here; that is not on earth.

LEWIS COUNTY.

BY N. D. STARR.

GEOGRAPHICAL POSITION. This county borders on the west side of the Mississippi river, between the river and Knox county.

SURFACE. The surface is mostly level or undulating, sometimes rising into picturesque hills and bluffs along the streams, then stretching away into vast prairies, generally running parallel with the general course of the streams.

SOIL. The soil is fertile, particularly along the margin of the rivers, and even the most barren ridges are profitably cultivated.

CLIMATE. The climate, though variable, is healthy, and the summer seasons are very warm.

RIVERS. The interior of the county is well watered by the Wyaconda, the North, Middle and South Fabiess rivers, with many other smaller streams of a never-failing supply of soft water, and an available water power for manufacturing purposes.

TIMBER. Along the border of the streams is found a great variety of excellent timber, of which white oak, black oak, walnut and kickory constitute the principal variety, amongst which is generally found a thick underbrush of crab apple and wild plum, also grape vines twining amongst the branches, producing fruit abundantly.

LANDS. The lands of this county have all been entered, of which there are large tracts owned by non-residents, and also some owned by railroad companies. Improved farms are sold at an average price of fifteen dollars per acre, and the average price of unimproved lands is less than five dollars per acre.

MINERALS. We have no mines in operation, although we are assured that veins of excellent coal exist in the northern part of the county. Limestone is found in abundance, and is extensively used for building purposes and burning into lime. No indications of coal oil exist, which has very generally excited the inhabitants of other sections of the State.

MILLS. Our mills are scarce, although we have a number of excellent flouring mills and carding factories. Our agricultural implements, with the exception of plows, are generally imported.

FAIRS. We have an agricultural and mechanical association, incorporated by an act of the Legislature, approved March 14, 1859.

CULTIVATED LANDS AND CROPS. About one-half of the county is in cultivation, of which the productions are wheat, corn, oats, hay, buckwheat, sorghum and potatoes. Both fall and spring wheat are raised. Fall wheat produces an average crop of thirty bushels per acre among our best farmers. Neither drilling or sub-soil plowing has been introduced to any extent, which would probably increase the wheat crop fifty per cent. Corn is extensively cultivated for feed, which is generally fed to stock in the ear, and but small quantities are exported. The cultivation of sorghum has become general; is now raised upon almost every farm, from which small quantities of sugar have been manufactured. Many improvements have been made in the implements for its manufacture. Attention is paid to raising hay and tame grasses, which meet with success. Timothy and clover mixed are more profitable for winter feed, but extensive fields of clover are cultivated for pasturage. Large quantities of Hungarian hay are raised, the use of which does not meet with the approbation that clover and timothy do.

HEDGING has been tried, and excellent Osage fences in different parts of the county exist.

ORCHARDS are not generally cultivated, although both climate and soil are adapted to the raising of fruit trees. For information I would respectfully refer you to John C. McAfee, who is a professional fruit grower, and has an excellent and extensive nursery near Lagrange, in this country. He may also be able to render the required information in regard to vineyards.

Immigration into our county during the past summer has been vast, and with each Eastern immigrant are introduced improvements in farming implements, stock, system and mode of cultivation, that promise fair, in the course of a few years, to so much improve our section of country as to be able to compete with older States in resources.

PETTIS COUNTY.

A report has been received from the County Clerk of Pettis county, made upon a blank which was issued by the State Board of Immigration. It states the general features of the county undulating. Streams, Flat creek and Muddy, good for water power.

PRODUCTIONS. Timothy, blue grass, corn, wheat and oats. Average yield of corn, thirty-five bushels per acre, worth fifty cents per bushel. Average yield of wheat, fifteen bushels per acre; oats, forty.

FRUITS. Apples, peaches and grapes. The county is well adapted to stock raising.

MINERALS are stone coal and lead.

The north, south and west parts of the county are well timbered with oak, walnut and hickory.

LAND worth from five dollars to thirty dollars per acre, and much for sale. Laborers' wages, fifteen dollars per month.

This is about all the agricultural information that the report contains.—[*Corresponding Secretary.*

PHELPS COUNTY.

ROLLA, December 14, 1865.

L. D. Morse, Corresponding Secretary, etc.:

DEAR SIR: In compliance with the request made in your circular, I herewith forward you a description of Phelps county and statement

of its resources, according to the best information at present; yet it must necessarily be limited, and not altogether as satisfactory as could be wished.

GENERAL DESCRIPTION. The country here is very much diversified, and may, as to its surface, be considered as divided into two sections, the eastern portion of the county being tolerably level and not so heavily timbered, consisting chiefly of high rolling prairies, with but comparatively few water courses. The western portion is rough and hilly, well wooded, abounding in numerous water courses, and though very healthy, can never be noted for its agricultural productions.

Extensive mineral deposits are found here, principally iron and lead. The former has been thoroughly tested, and found superior to any other in the country. Its tenacity and toughness are very remarkable, and competent judges consider it to be eminently suitable for railroad iron. The supply is inexhaustible. Lead ore has been found here, though the mines have not been developed. The prospecting, so far, indicates the presence of that mineral here in vast quantities. Copper is not found yet, but miners think some deposits are in the southern part of the county. Abundant springs, and peculiarly adapted to machine advantage. There is no county in Southern Missouri so well blessed with water power as this.

LAND, improved, can be bought at an average of six dollars per acre; unimproved can be bought at an average of four dollars per acre. Oak, of different varieties, is found on all kinds of ground; while cherry, maple, sycamore, elm and walnut are found only in the bottoms. No vines but grape, and shrubbery, hazel, sumach and crab.

Wheat, corn, oats, rye and sorghum are the principal productions. The yield will not differ from most of the counties in the State. Sheep have been raised in large quantities during the past year. Cattle, horses and mules are scarce, but efforts are being made to increase them.

Upon the whole, this county is not behind any in South Missouri. It is reasonably good for grain, stock raising and fruit. We have an abundance of water power and minerals, good timber, fine stone for building purposes, and some fine improvements are in progress.

Yours, respectfully,

HORACE WILCOX, *County Clerk.*

ST. CHARLES COUNTY.

BY JOS. H. ALEXANDER, ST. CHARLES.

The history of agriculture in St. Charles county would doubtless be more than ordinarily interesting, if the facts constituting it could be

recovered from that oblivion into which they are fast passing, gathered together by some careful painstaker, and properly eliminated by some one competent to the performance of the task. I am neither the one nor the other; but I have collected, and, in the following pages, present a few items touching the history and present condition of our agriculture and horticulture, which I hope may prove of sufficient interest to secure a perusal by the "present generation." I am very strongly inclined to the belief that "future ages" will care very little about the matter.

The county of St. Charles (under the territorial organization called district) originally embraced all the territory lying between the Mississippi and Missouri rivers, from the Missouri river to the British possessions, and from the Mississippi river to the crest of the Rocky Mountains, the dividing line between the waters of the Atlantic and those of the Pacific. From time to time these vast proportions were curtailed, until the county was reduced to its present wieldy and comfortable size. These changes gradually occurred as the country here and beyond became settled and the governmental wants of the people found expression, through the Legislature, in the erection of counties, successively taken from the original St. Charles county, and successively subdivided to meet the convenience of the increasing population. I say settled, because one hundred years ago St. Charles county was a howling wilderness, over which roamed the wild beast and the no less wild and savage Indian. Of course there was no agriculture here then, for the animal in human form supplied the wants of his body by the chase, as did the beasts of the field and the birds of the air, differing from them in externals in but little except, perhaps, in the means and manner of taking his prey; while the time not thus spent was consumed in an occupation also followed by beasts and vultures—in slaying other animals of his own species, either in single combat or in war. Thus the bow and the tomahawk—unagricultural tools—were the implements, almost entirely, in the hands of the only inhabitants of all this region, while the Indian, boasting the number of scalps hanging at his girdle, and aspiring to the position of a "brave," disdained the plow, "the shovel and the hoe," and other implements of husbandry, which constitute the foundation of the wealth and material progress of this and every other country.

But gradually the march of that encroachment which had steadily pushed back the son of the forest from Plymouth rock to the Mississippi, reached this wild region, and the red man receded before his white brother. First came the French, a light-hearted race, who, happy in the gratification of their few and simple desires, enjoyed the present with but few thoughts for the future. Those who first came engaged in a mode of life scarce less wild and roving than that of the savage whose country they had invaded, employing themselves in hunting and trapping, and in the fur and peltry trade. But soon families began to arrive and take up their abode in the wilderness,

and villages arose here and there. The first settlement in what is now St. Charles county, and, indeed, in all North Missouri, was made at *Village du Cote*, now the city of St. Charles. This was in 1780, sixteen years after Laclede founded the post of St. Louis.

Many of the villagers, and others in their vicinity, engaged in agricultural pursuits, the villagers being supplied, by grant from the Government, with a lot (one hundred and twenty by one hundred and fifty feet, French measure) in the village, and a tract of land at a convenient distance for farming purposes. The fields of that day differed materially from those of this day, as the system of surveying and laying off land used by the French Government differs from that adopted in the United States. Where the French system originated and how it came here I do not know. But however that may have been, and whatever may have been the reasons for its adoption elsewhere, the condition of things at that time imperatively demanded that this or some similar plan should be used here. The agricultural lands were laid one arpen wide and forty arpens long (an arpen, or arpent, is eighty-five one-hundredths of an acre, nearly,) and the farmer had one or more of these tracts granted to him, according to his ability to work a smaller or a larger tract, the number of his family, or other circumstances surrounding him. These farms were to be had for the asking, the only condition being that they should be worked. They were laid off immediately adjoining each other, and, as the inclosing of a piece of ground forty times as long as its width would cost more than the value of the ground inclosed, the farms were not fenced separately. Twenty, thirty, forty, any number of these ill-shaped farms being laid off together, the whole were inclosed by a common fence around all, which was maintained and kept in repair in accordance with certain specified legal requirements, under the direction of the syndic, an officer whose name and functions are well known to the readers of the civic law.

The fields thus inclosed were called "common fields," and one or more of these was around or near each French village; thus, the common field of Carondelet, the Grand Prairie common field at St. Louis, etc., and in St. Charles county, the Prairie Basse (Low Prairie), of St. Charles, and the Prairie Haute (High Prairie) common fields, adjacent to the (then) village of St. Charles, and the Portage des Sioux common field, near the village of Portage des Sioux; though these "fields" have long since lost their original character, taken more convenient forms, with partition fences between, and become subject to different laws.

Besides these particular grants to individuals in and about the villages, there was also always granted to the villagers, as a community, a more or less extended tract for the purpose of affording them wood for themselves and pasturage for their horses, cattle and other animals. These were the commune lands or commons, and were used as common property by all the villagers, who procured their wood and

timber from them, were inclosed by a common fence (if inclosed at all) and afforded pasturage for all. These commons were not intended to be, and were not cultivated, but used only for the purposes named, until the spirit of innovation invaded them also; and now they have been subdivided and leased for long terms of years or sold, so that they have, in effect, been diverted from their original design and use, and passed into the possession of private individuals. Examples of this tenure of land are to be found in the St. Louis, Carondelet, St. Ferdinand, St. Charles and Portage des Sioux commons, and others.

The grants just spoken of, those to individuals as well as those to the villages in common, were all located near, surrounding or adjacent to the several villages. In addition to them, other grants of larger or smaller tracts were made to individuals promiscuously through the country. These grants, like those before mentioned, were made without (pecuniary) consideration or condition, except that the grantees should cultivate or inhabit them. A party wishing a grant addressed a petition to the Governor, or the man occupying that position, stating that he "had the honor" to ask for a certain quantity of land at a certain place, assigning almost any reason, good, bad or indifferent, which fact or fancy might suggest, why the grant should be made. A very estimable gentleman, claiming under the original grant, now occupies a tract of land in this county which was granted to a man who stated in his petition that he had become impressed with the fact that the people of the country were suffering for the want of peach brandy, and that he was desirous of supplying their lack by planting an orchard and making brandy, and wanted some land at a place designated for that purpose; and the Governor, in his answer, very cheerfully acknowledged the fact that his people (and perhaps, he might have added himself, too,) were sadly in want of peach brandy; and so he gave the petitioner the land he had asked for; and the same man afterwards obtained an additional grant for the reason that the former grant was all prairie land, and now he wanted some timbered land so that he could get wood to run his distillery. In all cases where the Governor was disposed to comply with the request, he granted the prayer of the petitioner, and ordered the official surveyor to put the party in possession. The tracts thus granted were not surveyed in pursuance of any plan embracing the whole country, but were laid in every conceivable shape, the lines running to every point of the compass, and straight or zigzag, just as it happened. Without exception, I believe, they were always located upon a water course, and in the description of them in the deeds are frequently designated as being on the waters of such a river or creek, as McCoy's creek, Dardenne river, etc.; and whenever it was practicable, they were located so as to include a spring or springs, (as, for instance, Gilmore's Springs, on the North Missouri Railroad,) near which the dwelling was usually erected and other improvements made, for greater convenience in procuring water for cattle and for domestic purposes. These grants were

of various sizes and shapes, as the wishes or caprices of the grantees dictated, (the Government apparently caring for none of these things) varying in size from, say one hundred arpens, eighty-five acres, up to the enormous and unwieldy bulk of nine square miles, five thousand seven hundred and sixty acres, of which latter class an example may be found in the Avend Rutger's Survey "on the waters of Dardenne," in our county. The surveys being laid out very irregularly, with lines of varying length, and running, as I said, to every point of the compass, interfered greatly with the straight north and south and east and west lines, run by the United States surveyors when they sectionized and subdivided the country after it passed from France to the United States by purchase from Napoleon. An inspection of a sectional map of St. Louis, St. Charles or any of the adjoining counties, will show what I mean, and make this statement clearer than I can make it by mere words.

The original grantees or subsequent proprietors dying, the large tracts were partitioned among their heirs, and thus, and by ordinary bargain and sale, they have become divided and subdivided into smaller parcels, until now scarcely one is in the possession of single individuals, taking a course the reverse of that taken by the one-by-forty arpen grants near the villages, becoming smaller and passing into the hands of a larger number of proprietors, while the latter were combined together into larger tracts and are owned by fewer persons than originally.

From the facts above stated, the character of the agriculture of the early days of our county may be inferred with a reasonable degree of certainty. Near the villages, on the small strips composing the "common fields," the proprietors raised wheat sufficient for bread for their families, corn enough for their few horses and cattle, a few sheep, perhaps, for their warmer clothing and feet gear, a little cotton for lighter clothing, with garden vegetables and a few fruit trees, the forests being the source of their principal supply of fruit and a portion of their clothing, in the shape of deer skins, out of which pants, coats, vests and moccasins were manufactured; and in the intervals between other occupations, their time was taken up with hunting and trapping and trading in furs and peltries. On the larger tracts much attention, doubtless, was given to the objects just named, but horses and cattle probably formed the main staple of production. In both cases, there being but little demand for them beyond the wants of producers and their dependents, the surplus of agricultural products was small, and this of necessity arising from the lack of buyers, or the want of that energy always displayed in active commerce.

And the implements used in those days were as simple and primitive as the people who used them. The ax with which they cut their firewood was made by some blacksmith, who had wandered into these Western wilds to ply his trade, who likewise fashioned the shares of their plows, while some rough carpenter made the old wooden mould-

board. The wheat was cut by hand, for McCormick, and Haines, and Manny, and others of that ilk were, perhaps, not then born. It was trampled out by horses or oxen, or beaten out with the flail, for Pitt's patent, and Cox & Robert's and other threshers were not then dreamed of. The corn was gathered in the little two wheeled cart, a specimen of which can yet occasionally be seen. The grain was taken on horseback, or in the same little French cart, to some neighboring mill, run by water or horse power, and made into flour or meal, for that was before the day of steam, and baked in the old bake-oven or skillet, with hot coals before the fire, for that was before the days of cooking stoves. And so I might continue to specify, but enough has been said to show a marked difference between those days and these.

After the cession of Louisiana, when all this Western country became a part of the United States, American emigration turned its course hither. Some Americans were here before the "change of government," but that event gave an impetus to that character of emigration which it had not before. These brought with them their manners and customs, ways of living and modes of tillage, and thus, from that day forward, by the coming hither of Americans, Germans, French, Irish and representatives from various other nationalities, but principally of Americans and Germans, these things have gradually changed, until agriculture, including in that term all kinds of production, in this county has risen from its former rude and imperfect state to that in which we now find it—not perfect, by any means, but still far in advance of what it was.

This advance would naturally be expected to keep pace somewhat with the progress of the county in wealth and population, or, stated differently, the advance of the county in wealth and population affords a somewhat sure index to its progress in agriculture. And in these respects, our advance has been steady, and sufficiently rapid for a healthy growth. In 1809, when St. Charles district embraced an indefinite extent of country between the two rivers, extending as far, I presume, as the population did, the valuation of taxable property was twenty-three thousand eight hundred and ninety-five dollars. In 1818, when the limits of the district were more circumscribed, but still extensive, the valuation of taxables (found by approximation and calculation) was eighty-seven thousand four hundred and nineteen.

In 1836 it was	$ 727,573
In 1840 it was	1,290,786
In 1851 it was	1,503,796
In 1856 it was	2,998,800
In 1865 it is	8,156,940

From 1809 to 1818 the valuation nearly quadrupled; from 1818 to 1836 the increase was over eight hundred per cent.; from 1836 to 1840 it was about fifty per cent.; from 1840 to 1855 it was nearly fifty per cent., and in the last ten years, ending with the present year, it was about two hundred and sixty-five per cent.

In the first twenty-seven years the increase was uniform, being at the rate of something over one hundred per cent. per year; in the next fifteen years it was again uniform, at about fifty per cent., and in the last ten years it was about twenty-six and one-half per cent. per annum. Although the rate per cent. of increase has diminished, yet the actual increase has been large, having risen from twenty-three thousand eight hundred and ninety-five in 1809, to eight million one hundred and fifty-six thousand and forty dollars in 1865.

The population of the county in 1830 was four thousand three hundred and twenty; in 1840 it was seven thousand nine hundred and eleven; in 1850 it was eleven thousand four hundred and fifty-four; in 1860 it was fourteen thousand three hundred and thirteen. Adding to the population of 1860 the same rate of increase as held good from 1850 to 1860, (and I am quite sure that this is not unreasonable, even taking into consideration any depletion which may have been caused by the war,) the present number of inhabitants in the county is about sixteen thousand.*

I have made no little effort to obtain other statistics, showing the progress we have made in other particulars, but in that regard have been rather unfortunate. Either the statistics are not in existence, or, after diligent inquiry, I have not been able to reach them. I present, however, a few items, and some of my own calculations, based on them:

In 1840 we had.....3,509 horses and mules.
In 1850 we had.....4,772 horses and mules.

And at the same rate of increase we should now have seven thousand six hundred and forty-five horses and mules.

In 1840 we had..... 4,606 sheep.
In 1850 we had.....10,425 sheep.
In 1865 we should have.....26,780 sheep.
In 1840 we had.....19,324 hogs.
In 1850 we had.....30,957 hogs.
In 1865 we should have.....64,390 hogs.

But I am afraid that an actual count would show that we have less of sheep and hogs than my calculations show we ought to have. And so of other things, some increasing in a more or less accelerating ratio, and some decreasing; there being an increase in cattle, wheat, corn, oats, (largely in these) wool, potatoes, wine, hay, etc., and a decrease in hemp, barley and tobacco; but I am quite satisfied that in the last named article, notwithstanding the tables, there has been an increase.

DESCRIPTION. St. Charles county is bounded on the north by Eagle Fork (or Big creek) and Cuivre river, on the north and east by the Mississippi river, on the east and south by the Missouri river, and on the west by Warren county—the western being the only straight boundary, and the Mississippi and Missouri making the county in the general form of a wedge. It is well watered. Beginning at the north-

* Since writing this, I have found the census returns made by the sheriff in 1864, which make our population at that time fifteen thousand seven hundred and thirty-four.

west corner of the county, where St. Charles, Warren and Lincoln corner together, we run east with Big creek to Cuivre, (or Quivre) river, and then with the serpentine course of the latter, but in the general course a little north of east, to the Mississippi river. Descending the latter, in a few miles we came to Peruque creek, which rises in Warren county, in township forty-eight, makes a bend of several miles to the southward, runs thence northeastwardly, and finally makes its exit into the Mississippi river in township forty-eight. Next below is Dardenne creek, sometimes dignified by the name of river, which rises in township forty-six, on the line between St. Charles and Warren counties, runs first eastwardly and then northeastwardly, traversing, like Peruque, the entire breadth of the county, and empties into the Mississippi in the northern part of township forty-seven. These are the only considerable streams emptying into the Mississippi river. They traverse the county from west to east, and have numerous tributaries which drain and water a large part of the county. There is but one stream of noticeable size—the Femme Osage creek—discharging into the Missouri river. It rises on the border of Warren county, one branch in the south part of township forty-six, and the other about five miles south of the first, runs nearly east, and empties into the Missouri about two miles below the line between townships forty-five and forty-six. These are all properly called creeks, as none of them are navigable except the Cuivre, and it only for barges; possibly a small steamboat could run up it a few miles in high water, but I apprehend would be compelled to *back out*, as the stream is too narrow to admit of such a craft turning around in it. But we have two *rivers*, as Sam Weller would say, "rivers as are rivers," the "Father of Waters," washing one side of the wedge, and "Old Muddy" washing the other side and bringing the wedge to a point.

> "On either side, in grandeur rolls
> The world's two hugest streams;
> Each has length to span the poles,
> And each the greater seems."

Such being the situation of our county in respect of living streams, its water power for manufacturing purposes is well nigh inexhaustible. In this remark I allude not to the propulsion of machinery by water alone, though we are not by any means deficient in this regard. Numerous mills could be propelled by Peruque, Dardenne and Femme Osage creeks, but there is at present but one on each, all grist mills. The one on Peruque is about to be converted into a steam mill, so I hear. But there is scarcely a limit to the number of mills that might be run by steam along the banks of these streams, to say nothing of the Mississippi and Missouri. At the date of this writing there are twenty mills in the county, five propelled by water and fifteen by steam. Of these, five are in the city of St. Charles, one on Big creek, three on Peruque, three on Dardenne, one on the Mississippi, two in

Augusta, and the remainder at various points through the county, on the tributaries of the streams above named. Water can be obtained at all seasons, though Big creek, Peruque, Dardenne and Femme Osage, during parts of the year, are but rivulets, but they are never dry, and a sufficiency of propelling power could be obtained without a day's intermission, the springs from which they arise and those which feed them still continuing to give forth their treasures of the "beverage prepared by God himself to nourish and invigorate his creatures and beautify his footstool." Indeed, one of the mills included in the above list is afforded power more than sufficient from a single spring, the rivulet into which it empties being oftentimes dry, but the spring never failing.

TIMBER, &c. The county is well wooded, as I have stated above. There is now a superabundance of timber, and will be no lack for generations to come. Our principal trees are hickory, (of all kinds) oak, (burr, white, black, red, pin and post) walnut, (black and white) maple, (common and sugar) elm, (red and white) cottonwood, pecan, sycamore, hackberry, linn, mulberry, locust, ash, box elder, black jack, pawpaw, sassafras, birch, buckeye, coffee nut and cedar. Of some of the last named, but comparatively few specimens can be found. With these trees are found the usual smaller trees, shrubs and underbrush. In the woods and on our prairies we have wild cherries, wild grapes, hazel nuts, pecans, hickory nuts, walnuts, pawpaws, May apples, strawberries, raspberries and blackberries, there being large quantities of hazel nuts, pecans, hickory nuts, walnuts and blackberries, and a smaller supply of the others. There is a tree in Femme Osage called the chincapin oak. I have not seen a specimen of the tree or the fruit, but from the description of others, I am satisfied that it is not the true chincapin, found in the Southern States, which produces a fruit that, in my judgment, is equal to the chesnut or the pecan, and far superior to the hazel nut.

LANDS. If there are any Government lands in the county I am not aware of the fact. I think I am safe in the assertion, that whatever small pieces may have escaped entry are of no great value, and practically it may be said there are none. The most valuable lands were taken up long since, and then the next valuable, until all have been entered at the Government price. I find by actual count on the tax book for 1865, there are thirty-three thousand six hundred and thirty-nine and forty-six one-hundredths acres of land, and one hundred and seventeen town lots in the county owned by non-residents. These lands and town lots are valued at two hundred and four thousand nine hundred and ten dollars. They are marked on the tax list as "non-resident;" but this does not mean that the owners are non-residents of the State, but only of the county; and I know, as a matter of fact, that the larger part, perhaps three-fourths, is owned by residents of the State, though non-residents of the county. I know of no lands owned by corporations, except some graveyards and some lots in St.

Charles and Portage des Sioux, and a few church lots in other parts of the county, owned by the St. Louis University, a Catholic corporation in St. Louis, a church corporation in which, I believe, all church property owned by that denomination in the State is vested. I should perhaps mention in this connection that the school corporations of St. Charles and Portage des Sioux own the lands and lots, donated to the inhabitants of the respective villages by the act of Congress of June 12, 1812—at least, all that the respective boards have not sold, or conveyed to conflicting claimants by way of compromise; but the amount of this property is comparatively small.

As a matter of course, the prices of land, both improved and unimproved, are as various as the various circumstances surrounding them, the prices of improved land depending on the character and extent of the improvements, the nature of the soil, the situation of the lands themselves, whether on the hills or in the bottoms, whether high or low and on accessibility to market, and the purposes for which they can be used. Many of these elements of value, also, of course, enter into an estimate of the price of unimproved property. I know of one farm of two hundred acres, near St. Charles, which sold over two years ago for two hundred and four dollars and fifty cents per acre. The dwelling and out-houses were of indifferent quality, and the fences were ordinary plank fences; but there were on the farm two large orchards and a fine cider house. The farms immediately in the vicinity of St. Charles city can be bought at about that figure, some more, some less, according to quality and condition of land and improvements. As we leave the city, the price diminishes quite fast as we go over the hills, and more slowly as we go in the direction of the Point Prairie. In that prairie sales have been made lately, and for a year or two past, at about one hundred dollars per acre, one farm, with indifferent improvements, bringing one hundred and twelve dollars. From these figures, the price ranges downward to, say thirty dollars, and in some cases perhaps less. For unimproved lands, the price may be stated at from five dollars to thirty dollars, according to quality, situation and accessibility to market; though we have, as I suppose, some lands that cannot be sold at five dollars, because from their situation they cannot be improved at all, or only at great expense; and as long as better lands can be had, the latter will always be taken, even at a much larger figure.

MINERALS. Some of our hills are rich in certain kinds of underground wealth. The city of St. Charles is built on the first rock foundation in the county, ascending the Missouri river; and from that point all along that river to the Warren county line, an inexhaustible supply of rock may be had, entirely or almost entirely limestone, so far as I am informed, though, I believe, there is some sandstone also to be found in some places. The quantity of rock suitable for building, macadamizing, curbing, guttering and paving, and for the manufacture of lime, is abundant in and around the city of St. Charles, and much

is used for these purposes. The lime necessary for the supply of the city and vicinity is made in the city itself, besides which, one lime-burner (the largest) has exported annually about seven thousand barrels for the last four years, his manufacture for the four years being eleven thousand, thirteen thousand, fourteen thousand and sixteen thousand barrels respectively. There are no indications of iron, lead, copper or other ore, nor any of coal oil. No mines of these kinds exist, nor has there been any boring for coal oil. This does not argue that no coal oil exists in the county, for our coal beds are quite extensive, particularly in the immediate vicinity of St. Charles.* At this point, coal mines have been in operation for a number of years past, but none at any other place in the county. According to my present recollection, there are four pits now wrought; two others have been opened, but for some years have been idle. Many years ago another was wrought, but for twenty years or more has been closed. Concerning this last, which is situated on one of the finest farms in the county, an old miner once remarked to the owner of it, "that there was coal enough under that one hill to buy the whole farm." There have been nine coal pits opened in the vicinity of St. Charles, but only four are now wrought, and two of these are owned and operated by one man. The vein if from twenty to twenty-four inches thick; no vein has been discovered thicker than twenty-four inches. Of the veins now opened, one is fifty feet below the surface, another is eighty-five feet, and the deepest is over one hundred feet. The quality of the coal is fair, not the best. It makes as hot a fire, perhaps, as any other, but there is more slate in the coal itself, and more debris than in the best article. As coal is an article that will not bear transportation to a great distance, and as coal mines of sufficient capacity for the supply of the home demand have been opened on the line of the North Missouri Railroad, and as St. Louis is supplied by the Gravois and Illinois mines, there is no exportation of the article from our county. On the contrary, it is brought hither both from Wellsville, in Montgomery county, and from St. Louis. In my judgment this need not be, for I am sure that out of the mines now wrought, and out of others that might be opened in the vicinity of St. Charles, might be obtained enough, and more than enough for our own consumption, whether for fuel or steam purposes.

MILLS. A majority of the mills before mentioned, located in the county, are combined grist and saw mills; but the business done by them in the grinding of grain is custom work, done for the convenience of their respective neighborhoods, and payment is made in kind. I believe, with a single exception (one of the mills at Augusta), none of them manufacture for export. In the city of St. Charles there are

*Since the above was written, I see it stated in one of the St. Charles papers that coal oil has been discovered on the farm of Mr. John Nahm, near Hamburg, and that it is running in a stream the size of a man's finger.

three flouring mills engaged exclusively in that line. These all grind wheat and corn raised in the county, the supply at home being ample, and no importation of late years having been necessary. The three mills make about one hundred barrels of flour each per week, making the total for a year about sixteen thousand barrels, consuming about eighty thousand bushels of wheat; perhaps more. They also grind corn, but the quantity of meal made is not large, none, I believe, being exported, but only enough made to supply those residing in the city and its vicinity, the people in the country being mostly supplied with both flour and meal by the neighborhood mills before mentioned. The amount of corn meal ground at the three mills in St. Charles may probably be stated at four thousand or five thousand bushels. There is also here a very large and commodious mill not now in operation. It was built many years ago, and was operated successively and largely by several millers, but, seemingly, without much profit, and it is now idle. Its capacity is about one hundred barrels per day, with ordinary running, and it has turned out nine hundred barrels per week. That was in some of its palmiest days, when it was operated with vigor and its capabilities fully tested; and in the hands of experienced and energetic men, with large capital and corresponding financial ability, it could easily be made to repeat its former self.

We have here also two large woolen factories, both substantial brick buildings. One stands forty-five by one hundred and sixty feet on the ground, and for one hundred and ten feet of the length is two stories high; the other stands forty by ninety feet on the ground, all two stories high, and for a part of the length three stories high. The buildings, fixed and movable machinery, including all the apparatus required for a complete outfit, may be safely valued at ninety thousand dollars. They run thirteen hundred spindles, twenty-four narrow and ten broad looms, four sets of forty inch and one set of forty-eight inch cards, and each has a full set of dyeing, washing, shearing and finishing apparatus. They make fulled linsey, plain and variegated flannels, blankets, jeans, stocking yarn, etc., etc. The capacity of the machinery is equal to the manufacture of, say one hundred and forty thousand yards of linsey per annum; but that number of yards of that particular fabric is not annually produced, because blankets, flannels, jeans, etc., are also made, and if more is made of one kind of goods there must be less made of the others.

IMPLEMENTS. Considerable attention has been given to improved farming implements and machinery for agricultural purposes. For many years the best plows have been used; Tobey and Anderson's, Peoria, Deere's Moline and three-horse plow, made at Jerseyville, being the principal kinds, while many farmers use our excellent plows of native manufacture. Very lately, Leeper & Kiddy's corn cultivator, made at Jerseyville, has been introduced. It is used for plowing corn after it is up and until it is two feet or thirty inches high, the plow being drawn by two horses, which walk on either side of the row

plowed, while the plowman rides on the plow, occupying a seat prepared for the purpose. It has been stigmatized (more by way of joke, I apprehend, than in earnest), as the lazy man's plow; but by all who have made use of it, its results have been pronounced highly satisfactory. Several kinds of horse hay rakes are among our farmers, and are extensively used, as are also different wheat and seed drills, and, to a less degree, broadcast seed sowers. For mowing, I name the Hubbard mower, and Manny's reaper and mower. Ketchum's mower was formerly in vogue, but I do not know of a single one in the county at this time. Some of our farmers are now supplying themselves with a patent horse fork for stacking hay, the name of which I did not get, or it has escaped me. For harvesting wheat, the Buckeye reaper, the Kentucky harvester and McCormick's reaper are extensively used. McCormick's reaper has long been in our county, and has been and still is more in use than any other single machine. For threshing, we have the Alton machine (Pitt's patent), manufactured by N. Hanson & Co., of Alton, the Cox & Roberts machine, made by Kingsland & Ferguson, of St. Louis, and others, the names of which I cannot now recall, but the first named has been used more, I think, than any others. There are no agricultural implement factories in our county, and no farming utensils are made here, except plows and harrows, and I might venture to say comparatively few plows; certainly none for export.

AGRICULTURAL SOCIETIES. We have had an experience of agricultural societies. In 1856, the first society was organized. The funds were obtained by the sale of annual memberships, donations, competition fees and entrance fees at the gate. The premiums offered were goblets, spoons and various kinds of silverware. Considerable expense was incurred in "getting the thing up" and carrying it through, and when we came to settle up after the first fair we had—nothing. Not discouraged, however, we went to work, and a second time had an agricultural fair, but, at the final winding up of the accounts, found that we were no better off in funds than before we started. We then concluded to form a joint stock company, and being duly incorporated, proceeded to raise and collect the stock. The stock, amounting to some three thousand dollars or more, was duly raised and paid in installments as required, added to which we had the same sources of revenue as the first society. But still we could not make the account balance; there was an evident preponderance, but it was on the wrong side. We purchased thirty acres of land for a fair ground, at one hundred dollars per acre, but at the end of a year or so relinquished fifteen acres of it, retaining fifteen acres, at one hundred and fifty dollars per acre, thus making the cost of the ground two thousand two hundred and fifty dollars. This, with one thousand dollars or more spent in fencing, building the necessary houses, booths, stalls, show ring, pagoda and seats for the audience, saddled a debt on us from which we never recovered. Matters at last seemed to have become

desperate, and many wished to square up, sell and quit. There were others, however, who wished to make one more trial. The county was canvassed, and two thousand five hundred dollars additional stock subscribed and paid with commendable promptness. This latter was called "preferred stock," the "preference" being that by the terms of its subscription that stock was to receive six per cent. annual dividends before the old stock should receive any, and at the breaking up of the society (should such a catastrophe happen), the preferred stock was to be paid in full before any part of the old stock should be paid. This was in 1860. We offered more premiums than ever before, and of greater value, and made extra efforts to have a good fair, and withal make it a paying concern; but it wouldn't do. After adjusting the account, we found that even this time we had lost money. I was secretary of the society from the beginning to the end, and had, perhaps, as good a practical experience of the difficulties attending the enterprise as any other one man, and even before the preferred stock was raised, I urged a sale. After the fair of 1860, I felt more discouraged than ever, and again advocated a sale of the society's land and a dissolution of the company. The troubles in the country prevented us from holding a fair in 1861; and in 1862, at last and as a grand finale, after we had paid eight per cent. interest on a large part of the cost of the fair ground from the time of its purchase, we sold it back for one thousand five hundred dollars, to the same party from whom it was bought at two thousand two hundred and fifty dollars. The sale enabled the society to pay its debts, every one, in full; but what of the stock? None of it ever paid a dividend; the old stock was sunk out of sight, and the preferred stock was visible only to the extent of about fifteen per cent.

The object of this society was uniform with that of similar associations, to be the means of introducing new and profitable varieties of animals and improved modes of culture, and produce a spirit of laudable emulation among farmers and stock raisers, so that all might thereby be benefited. One distinct branch was the mechanical department, in which were shown, or intended to be shown, all sorts and sizes of handicraft, the design of which was the introduction of labor-saving implements of all kinds. In endeavoring to carry out these objects, ours was a total failure. Perhaps I am wrong to say total failure, but so far as can be seen and known, if any results in the direction aimed at by the society have followed its operations, they and the society hold the relation of antecedence and sequence merely, and not that of cause and effect. On the whole, some good may have resulted from the existence of the society; but while it was in active operation, and a few were using their utmost efforts to make it "pay" (not pecuniarily, but in those other respects as easily understood as described), it was painful to meet the active opposition of some and the apathetic indifference of nearly all, while we could secure the direct or even indirect coöperation of but few. Scarcely

anybody seemed to think it was his fair, or his county's fair, but almost every one seemingly had an idea that it was a concern that belonged to somebody else, about which he need trouble himself very little or not at all; and the consequence was, as might have been expected and as could not well have been otherwise, the craft stopped for want of propelling power, the body died for want of breath; and so I may add, judging from my own experience, will it ever be with these societies, unless the concurrence and more or less energetic coöperation and persistent effort of a large number of active members can be secured.

The principal productions of our county are wheat, corn, oats, rye, barley, clover, timothy, Irish and sweet potatoes, buckwheat, tobacco, apples, peaches, pears, grapes, etc., etc. A cursory view of some or all of these may be profitable. Of those named, the principal are wheat, corn, tobacoo, oats and hay.

WHEAT. I have been asked what is the average yield of wheat among our best farmers. It is difficult to answer the question, because to point out the best farmers, I must have a standard by which all must be measured, and if I am told that the greatest amount of produce per acre evidences the best agriculture and the best farmer, I deny the conclusion, because that depends on many other things besides good cultivation. Fifty bushels per acre have been raised in our county, but it by no means occurs that the same man will have the same large crop every year, year by year. So many things affect a wheat crop, that it has been said, and truthfully, too, that no one is ever sure of a wheat crop till he has the money in his pocket. Even if it be sown in due season, the fall may be unfavorable for its becoming well rooted before winter; in winter, the snow may be light, or the weather may be so changeable that the snow which falls may lie but a short time, or the wind may blow it from the wheat, so as to expose it; in the spring, when warm days and freezing night alternate, in lands inclined to be spongy, the root may freeze out and be killed; and these things, one and all, make against the raising of a satisfactory crop. I do not believe that we are exposed to these hindrances more than others are, perhaps not so much. Certain it is, that with all the drawbacks of which farmers are so accustomed to complain, the wheat crop of our county is an average good one, and will compare favorably with other localities, both as to yield and quality. I cannot positively assert the fact, but from the most careful canvassing of the subject, I am satisfied that our average annual production of this grain is one million bushels. Fall wheat is principally and almost entirely raised; the proportion of spring wheat to the whole crop must be considerably less than one-tenth, perhaps less than one-twentieth. Neither sub-soiling nor under-draining has been practiced among us, at any rate to any appreciable extent, but the drill is much used, and with entire satisfaction. If wheat is to be raised on land which has grown the same grain the previous season, the stuble is plowed under, some-

times burned and sometimes not, depending on the fact whether the previous crop has been reaped or headed, the grain sown and harrowed in, or else drilled in, according as the one or the other can be done. Sometimes two plowings are made, and sometimes two harrowings. If it is to be sowed on land then occupied by corn, the corn is cut and shocked, the ground plowed and the grain sown as before stated; or sometimes it is sown among the corn stubs, and plowed and harrowed in, or simply harrowed in; or, sometimes, if the corn stands sufficiently erect to admit of it, the wheat is sown among the standing corn, and covered with a cultivator. But, as a general thing, the ground is plowed and prepared and the seed sown with care, and only in certain exigencies, when such a course seems unavoidable, do our farmers allow themselves to pursue the slovenly and unfarmerlike system last named. The average yield may safely be set down at twenty bushels per acre, often more, seldom less. Careful cultivation, good drainage and a cessation of efforts to cultivate too large a breadth of land, which too many of our farmers undertake to do, would materially increase this average.

CORN. The average yield of corn per acre may be stated at forty bushels. White corn is mostly raised, with a considerable proportion of yellow and mixed. As to the varieties, I much question whether one farmer in a hundred knows the kind he raises, and if asked the question, would, in all likelihood, reply that it was white, or yellow, or mixed, as the case might be; and even if he should name the corn, the probability is that an examination would show that the seed was not pure, but adulterated with some other variety. Yellow corn is considered the best for stock. The corn intended for ordinary stock feeding is cut up, stalk and all, before the blades have fully ripened and faded, and shocked in the field, two hundred and fifty-six hills (sixteen hills square) in a shock. Sometimes it is hauled and placed in quantities near the feeding place, but usually it remains in the shock in the field, exposed to the inclemencies of the weather and the depredations of the mice, until it is wanted for use, when it is hauled in day by day as it is required, and thrown to the cattle without further preparation. Sometimes the cattle get the corn with the stalk, but usually not, the corn having been previously husked, unless cattle and hogs are fed in the same inclosure. A good deal of the corn is gathered in this way, but the greater part of it is husked from the stalk standing in the field, thrown into a wagon which accompanies the huskers, and cribbed. I say *cribbed*, but I do not mean exactly what I say, for some of our farmers are innocent of barns or cribs. Some certainly have them, and good ones, too; but then, again, some certainly have them not, using instead common rail pens, with a rail, puncheon, pole or loose plank floor, and covered with plank or rails or poles and straw. The corn, then, is husked in the field, housed in the crib or the rail pen which is made to serve the purpose of a crib, whence it is fed as required. That intended for the general market is shelled by machinery,

sacked and hauled to the river, the depot or the warehouse. Of course, the city of St. Charles and the towns in the county, and all non-producers, require some. That thus required is usually bought and sold in the ear. The average annual production of our county, of this grain, is about one million bushels.

OATS. I cannot even venture to give an estimate of the oats crop. I know, indeed, that it is a considerable crop with us, and much attention is paid to its culture, but of its aggregate, I have no means of judging. Its yield is about thirty-five bushels per acre.

BARLEY. The yield of barley is from thirty to thirty-five bushels per acre. Formerly it was cultivated to some extent in the Point prairie, but, latterly, its production has entirely ceased in that part of the county. It is grown by some farmers in the vicinity of St. Charles city, and in considerable quantity in Femme Osage township. I have not been able to procure even an approximate estimate of the amount annually produced, but it is considerable, and finds a ready market at the breweries in St. Charles and at other places.

Very little rye is raised among us, and I do not know of a single person who cultivates buckwheat for sale, year after year, though I am aware that some persons raise it in small quantities.

POTATOES. Time was, within my recollection, when we had no sweet potatoes, or scarcely any; but lately more attention has been paid to this esculent, and more and more every succeeding year. I do not know that any are exported; if so, it is an inconsiderable amount. My impression is, that, so far, the entire crop is consumed in the county. The same remark does not, however, hold good with reference to Irish potatoes. We produce many thousands of bushels for market every year, besides the large quantity consumed at home. I cannot say how many bushels, but, one year with another, it must make a considerable item. We have the red and white Neshannock, Mercer, English, Fluke, Peachblow, Cherryblow, Galena, etc. Neither my experience, observation nor information enables me to state which of these is the most productive, or what soil is best adapted to them, but taken together, without reference to kind, and in the whole county, I am safe in putting the average yield at from one hundred and twenty-five to one hundred and fifty bushels per acre. Sometimes three hundred bushels have been obtained, while, again, in some years, with an unfavorable season, on unsuitable soil, with, perhaps, improper or negligent cultivation, the yield is far below the average stated.

SORGHUM. Not long after the introduction of sorghum into the United States, and after it gradually found its way West, its cultivation was commenced here, and it increased materially when the supply of Southern molasses was cut off by the war. In the zenith of its glory it could not have been said to be extensively cultivated, and if its glory has not reached the nadir, it is considerably on the decline, for as a molasses producer the article is now scarcely seen in the county. There is not an evaporater in the county, nor never was, so far as I

know, all the molasses having been manufactured by very simple, home mady contrivances. The juice was expressed by running the stalk through wooden rollers—only one person in the county ever having used iron rollers for the purpose—and boiled in ordinary kettles or furnaces.* In this way molasses was obtained, but no sugar, granulation being found impossible, or, at any rate, unattainable with the appliances used. The molasses was not considered palatable, being used, not from choice or preference over that made from sugar cane, but rather as a substitute for the latter. Even if sugar could have been obtained, its sweetening properties were asserted to be so inferior to those of New Orleans sugar, that it could not, I think, ever have superseded the last named. Owing to the difficulty of its manufacture, or the absence of proper appliances therefor, or for some other reason, the crop has come to be considered unprofitable, and its cultivation has rapidly and perceptibly diminished, farmers finding it cheaper, and, therefore, naturally preferring to turn their attention to the staple crops, and purchasing their sugar and molasses. It has been raised for forage, and, I presume, that fodder is the main object in view in its present cultivation; but even in this respect, an objection is raised against it from the ill-effects said to be produced upon stock by the spongy nature of the fibre. Taken all in all, sorghum has not here fulfilled the high promises at first made in its behalf, and until some well-founded recommendation, not now known or considered, shall have its appropriate effect upon our farmers, it will not likely become either a large or permanent crop among us.

HEMP. When I first became acquainted here—now over twenty-two years ago—more or less hemp was produced; but from some cause the cultivation of it has now entirely ceased, and I believe that at present there is not an acre of it in the county.

FLAX. We have no flax to an appreciable extent—a few persons raise it for domestic consumption.

COTTON. We have no cotton, or next to none. I know of but one patch, comprising a few dozen stalks, very diminutive when I saw them, and unpromising. To those who have seen the cotton of the Southern States, that grown here seems like a burlesque. Still, years ago it was grown here, and I see no reason why it should not be again, at least to a small extent; but I am satisfied that it will never become an article of export nor afford an adequate compensation for the time and labor spent in its production and preparation for use.

TOBACCO. The tobacco growing portion of St. Charles county lies on its west side, being a strip of country about twelve miles wide, and

*I am informed that some of my statements in the text are incorrect. My informant, after hearing me read what I had written, states that there are several evaporators in the county, that iron rollers are used by several persons for expressing the juice, and that quite a large quantity of sorghum molasses is made by our people, but principally or entirely for home consumption. No exception has been taken to my statement in other respects, and I make this note only for the reason that I am extremely anxious that my report shall be reliable in every particular.

extending from Eagle Fork, on the north, to the Missouri on the south, and embracing Cuivre, Callaway, Femme Osage, and a part of Dardenne townships. A few small crops are produced lower down, in the region of St. Charles city and below, but in comparison with the balance of the county they are insignificant in quantity and inferior in quality. Owing to the high price of the article, many persons who formerly raised none, are now planting for their own use, though making no effort to produce any for sale. The bottom lands, being of an alluvial character and naturally strong, will bring heavy crops, but in such cases the leaf is large and overgrown, stemmy and of poor quality. New or freshly cleared land is best adapted for raising fine tobacco, for which purpose uplands, not too strong, are the best. With tobacco, quantity and quality are in inverse proportion to each other, it being found, at any rate here, that where there is a large yield the quality is inferior, and *vice versa*. The finest tobacco oftentimes does not stand more than six hundred pounds to the acre, and even under the most favorable circumstances rarely exceeds eight hundred pounds, while the coarser kind will often reach one thousand two hundred pounds. The average yield of all kinds together is from eight hundred to one thousand pounds per acre, the yield with this plant, as with other crops, depending on season, quality of soil, and good or bad cultivation. In quality, land timbered with hickory, black oak, white oak, post oak, pin oak, ash, dogwood, cherry and sassafras, brings the best. If quantity and quality are both desired, a light, loamy soil with a clay foundation is to be chosen. Good prairie land will make a large yield, but the article will be very coarse and will mature later than that raised on other soils, and hence be more in danger of being nipped by the frost. This remark holds good unless the land is well manured, so as to bring the plant forward rapidly; and I apprehend that on those of our prairies which are so rich as not to need manure for any purpose, tobacco would mature sufficiently early and would weigh heavy, though the leaf would likely be coarse. But so little has been raised on lands of this nature that the experiment is still an experiment, and I do not feel at liberty to hazard a positive statement.

The principal kinds of tobacco raised among us are the Oronoco, the Spotted Pryor and the Broadleaf, and they rank in the estimation of producers and manufacturers in the order in which they are here named. The first is most generally grown, and is considered the best for manufacturing purposes, and generally is more yieldy, though not so leafy, as either of the other varieties, and on rich land is much more brittle, which is an objection with some farmers. The Pryor is a large, leafy tobacco, and on new land, when ripe, yellows nicely and makes a fine article for manufacturing purposes, but is said to be not as sweet as the former. The Broadleaf is a large and generally coarse tobacco, chiefly used for shipping purposes, well adapted to low land, and yields from one thousand to twelve

hundred pounds per acre, and even more sometimes, but this is a good average yield.

Tobacco exhausts land very fast—that is, that property of the soil which is peculiar to the plant, especially that which is necessary for a good article, so that the same land, although bringing heavy crops and fine tobacco at first, will not bear repeated plantings. Rotation of crops here seems a necessity, and the condition in which the soil is left seems to invite it, for it leaves the land in better condition for another crop, and almost any other crop seems to grow better after it than after any other.

The methods of handling are various. It is generally split and hung on sticks, and then either cooped on the ground or hung on a scaffold to yellow; but some house, and yellow it in the house. The latter mode makes it more liable to houseburn, especially if crowded. It is also frequently cut and bulked before hanging until it yellows, particularly when time is precious and dispatch is necessary. It is generally cased by fire, some firing more and some less, there being in practice no settled rules on this point. This branch of business requires experience and judgment, as too much fire at any time, or any fire at the wrong time is very injurious, and not enough fire will injure both the quality and appearance of the tobacco. After it is cased it should never be fired, as the smoke seems to strike in more readily. Indeed, hard firing is generally going out of usé, and in some places and among some farmers is being wholly discontinued.

After mature consideration and discussion with a gentleman who is very conversant with the business, and who probably knows as much about the matter as any other person, I place the total annual production of tobacco in our county at five hundred thousand pounds. The average price obtained by the producer is about fifteen cents per pound, this of course including all grades. The average price of the best grade is one dollar and twenty-five cents per pound. The average price of the manufactured article is about eighty cents; the average price of the best, when manufactured, is about one dollar and seventy-five cents per pound.

At the present writing there but four factories in the county in actual operation. That of J. H. Newly & Co., at St. Charles, is of sufficient capacity to manufacture about one hundred and fifty thousand pounds annually, but they have never yet worked up to their capacity. The capacity of the other three factories, which are in and near Wentzville, owned by P. M. May, Esq., McRoberts & Grantham and Wilson & Co., I am not prepared to state positively, but from the information I have I place it at three hundred thousand pounds. I presume, however, that, like Messrs. Newly & Co., they have never done as much as their machinery is capable of doing. If the factories now in operation wrought to their full capacity, and if my estimate of their capacity and of the amount of tobacco raised in the county be correct, then these four factories would well-nigh consume all the surplus

tobacco of the county. But they do not. Much of our tobacco is exported before being manufactured, and our manufacturers buy from abroad. But as the factories are now run, it may be safely estimated that at least one-half of our crop is shipped in its unmanufactured state.

SHEEP. There are no sheep of pure imported breeds in this county. The man owning the largest flock and having the largest experience as a shepherd of any man in the county, Henry Beck, has a flock of fourteen hundred, of a mixed breed, about two-thirds merino and the balance the common native sheep; and his brother, Laurent Beck, has about nine hundred. These are the two largest flocks in the county. The amount of wool exported, that is, not consumed at home, is, say twenty thousand pounds. The health of the sheep is represented as good, but in this respect the advantage is all on the side of the native. When lambs are dropped, the shepherd expects that if any are lost the pure bloods will die, and in proportion to the purity of blood will be the loss per cent. The native sheep are of course acclimated, and the frequent and sudden changes, or some other characteristic of our climate, seems to seriously affect the imported animals and their offspring, and this in proportion to their proximity in blood to the native stock. The wool on imported sheep does not deteriorate, but, as Mr. Beck says, its quality will depend materially on the care bestowed by the shepherd on his flock and the quality and quantity of pasturage. Fomerly pasturage was abundant, but the breadth of it is becoming rather restricted, owing to the inclosing of vacant lands for farming purposes. But still there is reasonably good pasture and a fair supply of it, and I apprehend that the flocks might be doubled, or even quadrupled, without giving rise to the complaints that were so rife in some parts of Illinois two or three years ago. Our sheep-killing dogs are rather a civil set, for out of fourteen hundred Mr. Beck does not lose more than ten sheep annually from this source of loss, but still in the aggregate the loss must be considerable, and every hundred killed is just one hundred too many. Kill the worthless, thieving curs, and save the valuable sheep.

HAY AND GRASS. Twenty years ago, when the prairies were mostly open, farmers and stock raisers depended more or less, sometimes entirely, on wild grasses, both for pasturage and hay. Thousands of acres that were then in a state of nature are now covered by grain and cornfields, orchards and meadows, and wild pasturage has become much restricted in extent, in some places exceedingly so. This has forced farmers to make other provision for stock, and this necessity has had the effect of turning attention to tame grasses. The principal crops are timothy and clover, which do not need renewing for years, and Hungarian grass, which is an annual. I know of no other grass being planted. More breadth of land is covered by timothy than by either of the others. While it will not bear as close feeding as clover, owing doubtless to the bulbous character of the root, which

in close grazing makes it liable to be pulled up more easily, while the long tap root of the clover effectually preserves it in this respect, yet timothy maintains the preëminence for hay, because of its less liability to injury in the harvesting of it. The same amount of rain seems to injure it less than clover, the leaves and stem of the latter drying up and losing substance more than the former. At the same time that this is true, it is also true that timothy has a tendency to impoverish land; clover uniformly enriches it; but Hungarian grass is particularly impoverishing to the soil. An observant farmer once told me that on his farm he could tell by the size of the wheat where Hungarian grass had been sown the previous year, the line being distinctly marked by the growth of the wheat. Many of our farmers have an idea, whether well founded or not, that Hungarian grass, from the richness of its seed, is injurious to stock, particularly to horses. The consequence is that it is not much sown, our three grass crops being timothy, clover and Hungarian grass, and being produced in quantities and occupying places of importance in the order named.

Hedges. Some little attention has been paid to hedging, but where hedging is much used ours would not be noticed. A few persons have made trial of it, B. A. Alderson, Esq., having had one for ten years. Osage orange is made use of altogether for the purpose, with, so far as I know, a single exception, Mr. Alderson having a two-year old hedge of white willow. The Osage orange stands the winter well, and appearances indicate that the willow will not be injured by cold to a greater extent than the orange. Where proper attention has been given to the matter, reasonable success has crowned the efforts of those who have attempted to set hedges, quite as much as a reasonable man ought to expect, but perhaps not as much as is sometimes promised by those whose interest it is to sell plants. As to the cheapness of this kind of fencing, Mr. Alderson's opinion is very decided. The hedge needs careful attention, such as every farmer ought to give and such as every successful farmer does give to everything about him. It needs trimming twice a year and training according to circumstances. But allowing for all the trouble it gives one, and counting the original cost of the plants, Mr. Alderson's judgment, made up after ten years experience, is that ten per cent. of the cost of a post and plank fence will set a hedge and keep it in order ten years. His hedges turn hogs and pigs, rabbits can scarcely go through them, and birds only with difficulty. And his judgment is entitled to great weight, both as to the cheapness and utility of hedging, for he is an observant man and a close calculator.

Hogs. Although ours is not *par excellence* a hog raising county, it is safe to say that, at any rate, twenty thousand hogs are annually slaughtered for export, or driven to market. I do not mean to say that this number goes from the county annually, but that this number is consumed by others than those raising them, not an inconsiderable amount being consumed by the people of the city of St. Charles, who,

while they raise too many hogs as well as dogs, do not raise hogs enough for the supply of their families, and might have to buy less pork if they would (as they well might) dispense with four-fifths of the "curs of high and low degree," which make night hideous about town. The average weight of our hogs slaughtered, or marketed on foot, is about two hundred pounds. I have no reliable data at hand as to the number slaughtered. Judge Shrœr, at Augusta, kills about seven hundred every year, buying all of them on foot and slaughtering them himself. In St. Charles, some are slaughtered by the packers, but mostly they are bought in small parcels from the farmers, already dressed. My knowledge of the matter is perhaps too limited to justify me in advancing an opinion on the subject, but it does seem to me that St. Charles is a good point for pork packing. Large droves of hogs and numerous car loads of the same pass through to St. Louis, which might as well stop here, and would doubtless do so, if some person was at hand to buy. A "good thing" might be made of it.

We have few or no specimens of pure breeds, it being found by experience that, as with sheep, a mixed breed, a cross of the common hog with some of the improved kinds, makes a better animal, all things considered, than any other. Of late years there has been a great improvement in this respect. The breeds mostly introduced and crossed with each other and with the native hogs are the Irish grazer, Suffolk, Chester White and Poland, and their coming into the county has had a perceptible influence upon the general stock.

CATTLE. I suppose that the butchers doing business in the city of St. Charles slaughter about fifteen hundred cattle, large and small, every year, and, probably, as many more are driven to St. Louis. Almost every head of a family owns cattle of some sort, at least a cow and a calf. In many instances, especially if the cow is regular in coming home to be milked, and can be prevailed on to do so regardless of the calf, the latter is killed as soon as it has attained a killable age; and thus, (short-sighted policy!) that the trouble of taking care of it may be avoided and all the milk of the cow saved, many a calf is destroyed that might have grown into a good cow or ox, and the stock increased instead of being diminished. The killing of calves (and cows) is a serious evil, decreasing the stock to (what I am sometimes inclined to think) an alarming extent. It seems to me that if stock owners would carefully consider this matter, they would "cease to do evil and learn to do well," and better, in this regard; and whereas, there are now in the county say twenty thousand cattle of all ages, that number, as well as the profit of them, would very considerably increase. There are comparatively but few animals of pure, unmixed breed. There are some pure Durhams, and, perhaps, some of other kinds, but a very large proportion of the entire stock is of a mixed breed made by a cross of the common herd with Durhams or some of the other imported kinds. So far as I know, no person is breeding expressly for the dairy, and there are no dairies of consequence in the county;

indeed, I am aware of but one or two dairies that may with any propriety be called such. A great deal of butter is made, nevertheless, especially around the city of St. Charles, and finds a market there. With the adaptation of our lands to the various grasses and rutabagas, mangel wurzel and other products for feeding; with the comparatively large scope of country yet open and the range that may be had in the woods, woods pastures and meadows, and with the easy accessibility to market by the two rivers and the North Missouri Railroad, and otherwise, I wonder that the making butter and cheese is not pursued more than it is, especially when farms, easily convertible into dairy farms, can be obtained at a far less price than that asked for lands near St. Louis, while our lands, by means of the North Missouri Railroad, lie but an hour or two from that place, and thus stand almost on a par with St. Louis lands in respect to proximity to market, and entirely so in other respects. In my judgment, there is a fine opening here for experienced dairymen, and it is to be hoped that some of them will fill that opening.

HORSES. My estimate is that about four thousand colts are bred every year in St. Charles county. The open prairies near the water courses and the "point" (between the Mississippi and Missouri rivers, below Portage des Sioux), and the unfenced woods on the hills, afford ample pasture for all horses not needed or used on the farms. Formerly but little regard was paid to quality, but of late years there has been much improvement in this respect. Many years ago, the English gray, or a similar horse, known among us as the Boxer, was introduced, and, lately, the Morgan stock has been brought here. There is in the county quite a considerable number of stallions of the Morgan, Boxer and other breeds, the names of which it is not important to give. I am not aware of any one raising horses for the race course, it being the general aim to improve our horses for saddle and draught purposes. Mares of proper build and size are bred to some well known and approved stallion, care being generally taken to castrate all male animals whose pedigree is not known, so that we have in our county but few "woods colts." With no animal is more care taken in this regard than with the horse, the most valuable of them all, and the result is that but few really inferior horses are bred; and, taken as a whole, our horses will compare favorably with those of other localities.

A gentleman well acquainted with the subject, in whose judgment I have confidence, places the average price of work horses at one hundred and ten dollars, and of colts (meaning all colts from birth to the breaking age), at seventy dollars. A good horse will readily bring one hundred and fifty to two hundred dollars.

MULES. There are several jacks in the county, which stand their regular seasons, and quite a number of mules are foaled every year; but they are raised, I think, mostly for use, not for exportation, but if sold, bring remunerative prices.

FRUIT. From the earliest settlement of the county, apples, pears and peaches have been raised. There are some fruit trees scattered here and there through the county, generally but few, and, sometimes, but a single one in a place, which has borne fruit for almost as long a period as that covered by the memory of the "oldest inhabitant." But within twenty years last past, orchard planting has received a mighty impetus, so that, whereas heretofore those having fruit were the exceptions in the community, now the case is reversed, and those are the exceptions who have no orchards or trees. Almost all owners of the soil have some fruit trees, even though they have but a fifty feet lot in town. An apple tree, a pear tree, a peach tree is planted—more, often several, and in a few years the owner has the great satisfaction (known only to those who have experienced it) of plucking *his own* fruit, and it tastes neither of silver or greenbacks. Besides these small efforts, the results of which can scarcely be dignified with the name of orchards, there are many which *are* orchards. The production of fruit has been a success with us, so far as it has been tried, both in quantity and quality. I undertake to say that no country produces better Genitan apples than can be found here; and though I may not speak so unequivocally of other kinds, because I am not well enough acquainted with the facts, I hazard nothing in saying that our fruit generally will compare favorably with any other. It is almost entirely of superior kinds, grafted or budded from and on good stocks, and carefully cultivated.

Julius Mallinckrodt, of Augusta, has been a professional fruit grower and nurseryman for thirty years, and his son, C. T. Mallinckrodt, is opening a nursery and orchard near St. Charles. The farm adjoining St. Charles, known first as the Millington, and then as the Bangs, and then as the Parks farm, and now owned by Martin Williams, has been a fruit farm for thirty years or more. Robert H. Parks is now opening a similar farm in the prairie north of and eight miles distant from the city of St. Charles. Frederick Valentin, near Cottleville, has a very fine young orchard, not yet in full bearing. Lewis Howell, near Naylor's store, has, for many years, been a nurseryman and orchardist, and is in the habit of producing fine specimens of fruit. Judge Griffith has a considerable orchard on his farm, four miles from town, on the old Salt river road; and William H. Gallaher is just opening a peach orchard a mile from town. These, I think, are the principal orchards, but by naming *them*, I do not mean to say that there are not others as large and important as some of these, of which I may not be aware. Mr. Parks has an assortment of upwards of three thousand trees, and Mr. Williams about the same. I am not informed as to the size of the other orchards named, but they all run up into the hundreds, and some, perhaps, into the thousands. Besides these, there are numerous other orchards scattered all over the county, nearly every farm having one of greater or less size. I have no certain data by which to estimate the annual export, but I judge it must amount to

several thousands of barrels. All the apples raised are not such as can be shipped or even eaten. A large quantity of them is turned into cider. The county is well supplied with portable cider mills (and some stationary ones), producing what is wanted for use as a drink, for making apple butter and vinegar, besides some for export. On the Williams farm there is a stone cider house, built by Mr. Praks, costing about two thousand dollars, and well appointed with proper apparatus. The production of cider in this house is considerable, running up into the hundreds of barrels annually. The fruit from this farm, being of good quality, and great care being taken to prepare it properly for shipment, has always borne a prime price; and the cider made on it, with that made by Judge Griffith, being both manufactured by a peculiar process, known only to the proprietors, has always readily sold for prices above those obtained for other cider.

I understand that Mr. Williams contemplates the erection on his premises of a preserving house—a building not to be used, as might be imagined from its name, for the making or keeping of preserves, so called, but to be used for keeping fruit sound and fresh through the winter and spring and into the summer. At the usual time of gathering in the fall the fruit is placed in the room designed for its reception, where, by the application of ice when necessary, and other appliances, it is kept at a uniform temperature, at about four degrees above freezing point. It remains thus till about June 1st, when it emerges to daylight again as sound, as plump and as fresh as when housed in the fall. This is not an experiment with Mr. Williams, as he had a building of the same sort at Indianapolis; and he contemplates building one here of sufficient capacity to hold and safely keep ten thousand bushels. Those acquainted with the business and conversant with the various states of the market at different seasons of the year, can easily make their own calculations as to the probable profit involved in the enterprise.

In addition to apples, peaches and pears, we have numerous other fruits—cherries, plums, nectarines, apricots, quinces, currants, strawberries, raspberries, blackberries, etc., and all the usual field and garden products common to our latitude. Any one giving the matter a little care and proper attention, can have a succession of fruits from June to March, and Mr. Williams' preserving house will prolong it to the full end of the twelve months.

VINEYARDS. I am told by a gentleman whose information and judgment can be relied on, that there are about thirty-five acres of vineyards in our county, perhaps forty. The culture of grapes and the manufacture of native wines are receiving increased attention every succeeding year, and the business is found to be remunerative. The principal kinds of grapes raised are the Catawba, Norton's Virginia Seedling, Concord, Cassady, Clinton, Taylor's Bullitt, Herbemont, Delaware and Hartford Prolific. Among these, for table use, the Delaware stands first and the Concord second. For wine, Norton's

Virginia seedling is regarded as best, and the Concord next. But when the Catawba succeeds, it is the most profitable; and ordinarily, when it makes a full crop, it yields more than any other kind. The average yield of the whole is about five hundred gallons per acre—in a favorable season eight hundred gallons can be obtained—the ordinary calculation being eighteen pounds of grapes to the gallon of wine.

Thus have I given a sketch of our county, agriculturally considered; imperfect it may be, but still such as my abilities and the press of other engagements would allow me to make. In performing this labor (and it has been no light task, I can assure you) I have endeavored to state "the truth, the whole truth, and nothing but the truth," and if I have erred, I claim that such errors have been unintentionally committed. I have used my best efforts to

> —"nothing extenuate,
> Nor set down aught in malice;"

and if there be any who can do the work better (as I have no doubt there are), let them, with better heads and more diligent fingers, give us a sketch, abler, more truthful and more to the purpose.

As a conclusion of the whole matter, I think I can truthfully say that if this be not the garden spot of Missouri, it is capable of being made so; and having our rich lands and proximity to market offered them, capitalists seeking investments and others seeking homes in the West and in Missouri, should not, by any means, overlook St. Charles county.

SULLIVAN COUNTY.

BY J. COMSTOCK, BIRD'S-EYE RIDGE.

GENERAL DESCRIPTION. Sullivan county is situated on the dividing line between the Chariton, on the east, and Grand river, on the west. It is about two-thirds prairie and one-third timber, and is interspersed with streams running from north to south, varying from two to four miles apart. Its surface is rolling, and its sub-soil is clayey and tenacious. Its surface soil varies from one to four feet in depth upon the ridge, and from four to six feet in the bottoms, and consists of a light sandy loam. The creeks are rapid and fed mostly by surface water, and consequently are not very durable. There are some streams, however, that run mills a good part of the year. There are a few good springs, but they are not general. The water is soft, and there is plenty for stock. Good water can also be obtained by digging.

TIMBER. We have several varieties of timber, the most abundant of which are white oak, black oak, black and white walnut, hickory, red elm, white ash and cottonwood. We have fine groves of crab apple and plum trees, which yield plentifully, together with grapes, gooseberries, blackberries, raspberries, strawberries etc., which give a good variety of wild fruit.

LANDS. Our lands are all entered, and about one-half owned by non-residents. Improved lands are worth from five to twenty dollars per acre, according to the state of improvement. Unimproved land from three to fifteen, timber being the most valuable.

MINERALS. There have been no minerals discovered. Our county is well supplied with limestone and sand rock. There are indications of coal oil, but no experiments have yet been made in boring for it.

MILLS. Our county is not well supplied with flouring mills, but we have a few on the creeks. There are no foundries or woolen factories in the county.

IMPLEMENTS. The farmers use steel plows mostly for breaking; the double shovel and buggy plow for cultivating corn; the scythe and mowing machine for cutting hay; the horse rake for raking; the reaper for cutting grain, and the threshing machine for threshing it out.

AGRICULTURAL SOCIETIES have never been formed in the county, neither farmers' clubs or horticultural societies of any kind.

IMPROVEMENTS. There is about one-sixth of the land under improvement, and the county contains about four thousand inhabitants.

WHEAT has not been raised to much extent for several years, on account of the chinch bug.

CORN is the principal crop, and yields about forty bushels to the acre.

RYE, OATS AND BARLEY are but little raised, on account of the bugs.

BUCKWHEAT AND POTATOES yield well.

SORGHUM is raised to a considerable extent. There has been no sugar made from it here. The iron crusher and evaporator are mostly used in its manufacture.

HEMP AND FLAX are but little raised, and generally for home consumption.

COTTON has been raised by a few persons, but not to any extent.

TOBACCO is not raised for export.

SHEEP. There have been about twenty-five thousand pounds of wool reported during the last year. The sheep are mostly of the native stock. There are some merino and Cotswold, but are generally in small flocks. The prairies afford abundant pasturage. Sheep are very healthy, but there are a great many killed by dogs and wolves.

HAY AND TAME GRASSES. There is but little attention paid to tame grasses for pasturage, on account of the abundant pasturage on the outside. Timothy is sown for mowing, with good success, yielding about two tons to the acre.

HEDGING has been but little tried. It is the opinion of those who have tried it that the Osage orange will do well, as it is not easily winter-killed.

HOGS. The county furnishes about twelve thousand fat hogs for export annually, averaging about two hundred and thirty pounds, and four thousand stock hogs. Various persons have imported hogs from other States to improve our stock, and with good success.

CATTLE. There are about two thousand beeves exported annually, and about fifteen thousand of all ages in the county. There has been but little effort made to improve the breed, and there are no dairies of consequence.

HORSES. There are about fifteen hundred horses raised annually; average price, one hundred dollars. Draught horses are generally raised. There have been no particular efforts made to improve the breed.

MULES. There are but few raised in the county.

FRUIT. The citizens are generally raising orchards, with good success. Our orchards are yet young. We have no professional fruit growers in the county.

VINEYARDS. There are no extensive vineyards in the county. The citizens cultivate a few for their own use. Mr. Marine, of Greencastle, is the most noted vineyardist in the county.

Sullivan county is well calculated for farming purposes, but better adapted to stock. Stock of all kinds are extremely healthy.

We formerly raised good wheat, oats and rye, but for a few years it has been dry, and the chinch bug has increased so much that citizens have generally abandoned sowing. We think the abundant rains this past summer have killed the chinch bugs, as there are none to be seen this fall.

STE. GENEVIEVE COUNTY.

STE. GENEVIEVE, December 23, 1865.

L. D. Morse, Secretary Missouri State Board of Agriculture:

SIR: I have the honor, as president of the "Ste. Genevieve County Agricultural and Mechanical Society," to report that on the seventh of October, 1865, our society was incorporated by the Ste. Genevieve County Court, according to law; that we proceeded to elect a board of directors on the second of November, and that our board, on the seventh of November last, elected its permanent officers, and that our next meeting will be on the first Monday in January next, to adopt our constitution and by-laws.

I feel grateful to state that our people are now alive to the importance of our society, and confident by next year we will have a suitable lot on which to establish a well improved fair ground.

I regret that, owing to our recent organization, I am not able to gather sufficient accurate statements to make a complete report of the advantages our county offers in soil and products.

I will, however, state it contains very rich bottom lands along the Mississippi, also on our water courses in the interior. Our uplands are well adapted to the raising of wheat of a superior quality, averaging, under fair cultivation, about twenty bushels per acre. We have at present four good flouring mills and three ordinary ones. Our farmers sell yearly, above consumption, over one hundred thousand bushels.

In relation to fruit, our climate and soil are unsurpassed, and of late years considerable attention has been given to this branch of industry by our farmers. A great variety of fruit trees have been obtained from Eastern and Western nurseries, and recently a nursery has been established near the city of Ste. Genevieve.

Our vineyards are increasing rapidly, our German farmers taking great interest in the cultivation of the vine. We number over two hundred and fifty thousand in a bearing state.

We have as yet no blooded stock, except Southdown sheep.

In our next report we contemplate giving you a more full and complete statement of our farming interests.

I remain your obedient servant,

ALVA CULVER, *President.*

TEXAS COUNTY.

HOUSTON, December 1, 1865.

L. D. Morse, Secretary Missouri State Board of Agriculture:

SIR: Your circular was received in due time, and owing to a press of business I have deferred making my report until now. I will be compelled to be brief, more so than I would like. I will endeavor to give a notice of each of your interrogatories.

GENERAL DESCRIPTION. Its surface is generally rolling. Soil, mostly a mulatto, especially the valleys, which are considered the most productive.

ITS RIVERS. Big Piney runs nearly a north course, nearly through the center of the county, with a sufficiency of water during the dryest seasons to turn flour and saw mills, which are numerous. Its creeks and springs are also numerous and lasting, as follows: Arthur's creek, Brushy and Elk creeks—these are durable. Springs in abundance,

from the head to their entrance into the Piney. Brushy creek passes within a few hundred yards of Houston, our county seat, and I think there is a good mill site close to the town. No country can be better watered than this portion of the county. One other stream I will name, which is called Jack's Fork of Current river. This is also a lasting stream, and never stops running in the dryest seasons; its water is generally hard, and the water power for manufacturing purposes cannot be surpassed in any country.

TIMBER. A great variety: Black oak, white oak, post oak, indeed all kinds of oak. The most important are our pines, thousands and thousands of feet of pine lumber being sent off every spring and fall in rafts down the river—Big Piney. I have known five hundred thousand feet of No. 1 pine lumber sent off from one mill at one time in the spring season.

Wild fruit grows in abundance. Plums, blackberries and stawberries grow very fine; also huckleberries in abundance. Grapes grow in great abundance. I am satisfied that if the grape was cultivated it would yield with any part of the United States. This season there was a great crop, some of the finest wild grapes I ever saw in any country.

GOVERNMENT LANDS. There are thousands of acres yet to be had, under the homestead act or at one dollar and twenty-five cents per acre. This land is of course not the best, but there is good land yet to enter—great chances now for men of small means to emigrate to this county to get good homes for a small amount of money. Every attention will be paid to parties desiring to see vacant lands in the county. There is a large quantity of land owned by non-residents; none that I know of by corporations. Average price of improved land from two dollars and fifty cents to ten dollars per acre. I will, for the benefit of those wishing to purchase, give the names of some who have several improved farms for sale: Spencer Mitchell, one mile south of Licking; Valentine Sutton, at the town of Houston; Joel Sherrell, six miles north of Licking. The above are the largest landholders.

MINERALS. There is iron ore to be seen on the surface. Lead ore has been seen, yet there have been no discoveries of importance. If mineralogists were to make experiments, no doubt but there would be rich mines discovered in both. In some of the tributaries of a stream I have mentioned, Jack's Fork, there have been some discoveries of gold, so much that a company of Eastern men, in the latter part of the winter of 1860, or the early part of the spring of 1861, commenced mining in the vicinity, but they were not allowed by the rebels to continue their operations. If they are still alive no doubt they will again renew their operations.

MILLS. There are a number of mills on the water courses, but much improvement can and ought to be made. Here is a great opening for that class of mechanics. No woolen factories. These are greatly needed and would pay well.

IMPLEMENTS. Farming, a very poor assortment, and no factories in

the county; there were some before the war, but all are gone. Mechanics would do well here, especially plow and wagon makers.

AGRICULTURAL SOCIETIES. None in the county. No farmers' clubs. Have had no fairs, consequently can give no remarks on the effects. No one seems to take any interest in such enterprises.

The principal productions are wheat, corn, rye, oats and tobacco—all do well. Average of corn per acre, forty bushels; wheat, from fifteen to thirty; oats, from twenty to thirty; rye, twenty to thirty; tobacco, from eight hundred to one thousand pounds per acre. Spring and fall wheat, both are raised and do well.

SORGHUM grows well. Large quantities are made every year, though no one is well prepared to manufacture the molasses. Such as has been tried is very fine. Some have made a very small amount of sugar.

HEMP AND FLAX. Very little raised, though, when tried, they do finely.

COTTON, some seasons, does well, though not grown to any great extent.

SHEEP. This is a great country for sheep, but there are few in the county at this time in consequence of the army having been in the country. Thousands have been killed and taken off, generally the common breed. Much improvement might be made.

TAME GRASS. All kinds of tame grasses do well; the best grass is timothy and herd's grass mixed. Clover does well.

HEDGES. We have but little use for the hedge, though where tried it has done well.

CATTLE AND HOGS do well. I do not believe that we can be beat in any county in the State. Our cattle, the few left by the army, as well as hogs, are fat in the woods. I see to-day, the first day of December, cattle feeding on Arthur's creek bottom, on blue grass, lying in mats. Bushels of acorns are lying on the ground, affording sufficient food for hogs all winter—more than our present number of hogs can eat.

HORSES AND MULES also do well. The army has left us but few of either. When we have any for sale the market is at home.

FRUIT. Apples, of all kinds, pears, peaches, cherries and tame plums, all do well, though the peach fails oftenest. Always plenty of apples; some as fine as grown in any country. One of my neighbors brought in a couple of apples from his farm weighing two pounds.

VINEYARDS. None in the county that I know of. The grape grows perfectly natural.

I will conclude by merely saying that all our county wants to make it one of the foremost counties in the State, are enterprising and industrious men. We have a few, but more are needed. There are millions of dollars worth of the very best pine lumber to be manufactured when the mills are in full operation, and there ought to be more. There is a good market for all the farmer has to spare at his own door.

I have said nothing as yet respecting vegetables, which grow in

abundance. Potatoes, both Irish and sweet, are raised in abundance, as well as cabbages, beets, parsnips, and, indeed, all kinds of garden vegetables. All that is wanted to have a plenty of all is that a man work for them.

A. M. WADE,
Clerk of the Circuit and County Courts.

LETTERS ON FRUIT GROWING.

In order to obtain information in regard to fruit in portions of the State not usually represented in the meetings of the State Horticultural Society, letters were addressed, during the months of October and November, to such fruit growers in the sections referred to as came to the knowledge of the Corresponding Secretary. The inquiries addressed were brief, and much as follows:

MISSOURI STATE BOARD OF AGRICULTURE, OFFICE CORRESPONDING SECRETARY,
No. 12 NORTH FIFTH STREET, ST. LOUIS, October, 1865.

SIR: The State Board of Agriculture is desirous of obtaining information in regard to fruit growing in various parts of the State, and will esteem it a favor if you will give briefly the results of your experience and observation.

Give, if you please, the character of your location, soil, etc., and mode of cultivation. Name the best six varieties of apples for an orchard of one hundred trees, and the best twelve varieties for an orchard of one thousand trees. The diseases and insects you have to contend with, and the remedies. Give yield and prices obtained, if convenient. Give similar information in regard to other varieties of fruit, so far as practicable.

By complying with this request you will aid the cause of agricultural improvement in the State, and a copy of the proceedings of the State Board of Agriculture, and the proceedings of the State Horticultural Society will be sent to you as soon as published.

Please send your reply to me at this office on or before the first day of December next.

Very respectfully yours,

L. D. MORSE,

Corresponding Secretary State Board of Agriculture.

GRAPE CULTURE IN GREENE COUNTY.

SPRINGFIELD, August 19, 1865.

L. D. Morse, Secretary State Board of Agriculture:

DEAR SIR: I received your circular in due season from date, and would have answered sooner but for sickness and misfortune in my family.

It would have afforded me much pleasure to furnish a paper for the forthcoming report, but for reasons above stated; as it is, I have given the circular to Major Charles Sheppard, who is an old resident of this town, and a very intelligent and enterprising man, and he will, I think,

do the subject justice, and furnish a paper worthy of the State and the occasion.

You ask for names of scientific cultivators of fruit. As such, I take pleasure in recommending Colonel Henry Sheppard, of this town, and Mr. John Weaver, of Ozark, Greene county, either of whom I think will justify your expectations.

We have had, for the most part, a very wet season, and a number of sudden and extreme changes of weather this season, causing some varieties of grapes to rot badly, Delaware and Norton's Virginia seedling alone unhurt.

In 1857 Mr. Thomas Whitlock planted the first vineyard ever planted in this county, with Catawba and Isabella vines. It proved a failure. In 1860 Mr. B. F. Lee, of Martin, planted a small vineyard, of about a dozen varieties, including Catawba, Isabella, Norton's seedling, To Kalon, Northern Muscadine, Concord, Delaware, and some others which I do not now recollect. All grew finely in 1860 and 1861, since which time they have been utterly neglected, in consequence of the war. In the same year (1860) John Wood, Esq., planted a small vineyard—has fruited finely.

In 1861 I planted one and one-fourth acres to the following varieties: Delaware, Diana, Concord, Catawba, Hartford Prolific, Herbemont, Norton's seedling and Rebecca. A portion of the ground was prepared by trenching, the remainder by sub-soiling. The land had been in cultivation over twenty years, and never received a spoonful of manure. The vines grew with remarkable vigor through that season, with no apparent difference in growth between the trenched and sub-soiled portions. In October, while Fremont's army were resting at this place, six hundred head of large cattle were turned into the vineyard and nursery (being in the same inclosure) and kept there three days, trampling and mutilating the vines in a most shocking manner.

The rebel army under Price, stationed here through the following winter, destroyed what fencing remained, which left the whole thing exposed through the winter, so that in the spring of 1862 nearly one-third of the vines were totally destroyed. A portion of these were replanted, and those having a spark of vitality were well and tenderly nursed and cared for, so that in the following autumn they made quite a respectable appearance. In 1863 they made about five hundred pounds of grapes, each variety producing fruit except the Herbemont and Rebecca (and with me these varieties have never succeeded well.) In the excessive cold of January 1st, 1864, most of the buds of all the varieties, and the canes of some, were killed to the ground, so that in 1864 we only got about five hundred pounds of fruit, grapes.

This season has been characterized by sudden and extreme changes of temperature, and excessive rains. Since the first day of February, thirty-five and five-sixteenths inches of rain have fallen. The tenth of July ultimo, at two o'clock, P. M., the thermometer stood at ninety-

eight degrees; on the eleventh, at ten o'clock, P. M., the thermometer stood at fifty-four degrees, and wind northwest.

Up to that time our prospect was good for ten or twelve thousand pounds of grapes, but in less than one week our Concords and Catawbas were nearly all destroyed. Our vines are remarkably healthy and vigorous, having been as well cared for as the circumstances would permit. In 1864 we planted another one and one-fourth acres to grape, preparing the ground by sub-soiling, no manure, and have now on trial of Rogers' Hybrids, one, two, three, four, fifteen, nineteen and thirty-three, Allen's White Hybrid, Golden Clinton, Deveraux, Maxatawny, Iona, Isabella, Adirondac, Creveling, Cuyahoga, Union Village, Union Village seedling, To Kalon, Taylor's Bullitt, Clinton, and some seedlings.

Mr. A. G. McCracken has procured vines from me, and planted a small vineyard six miles southeast of Springfield, doing finely; which completes the history of grape culture in this county to this time.

I have been thus minute that you may the better judge of the merits of grape culture in Southwest Missouri, and especially in Greene county.

My observation and experience lead me to conclude that this will eventually become the finest grape district on this continent, California excepted; but we shall be compelled to discard some varieties which are justly considered favorites in other localities.

Your obedient servant,

H. FOSTER.

FRUIT GROWING IN JOHNSON COUNTY.

RAMEY, October 21, 1865.

L. D. Morse, Esq.

Yours of the 17th inst., requesting the results of my experience in the fruit growing business, etc., is received. The character of this locality is generally a rich rolling prairie country, but a very small portion unfit for cultivating with the plow. There is plenty of timber on the water courses, such as oak, walnut, elm, hackberry, linn, maple. The bottoms along the streams are of the richest kind; some wide, some narrow—from two rods to two miles wide; some of them subject to overflow occasionally, though not very often. Some never overflow. When the county was first settled there were a great many lakes or ponds. There are some of them yet, though most of them have been drained, with very little labor, a few furrows with the plow being sufficient for the purpose. Sand and limestone are generally plentiful,

the latter most abundant. For building and fencing purposes, with a few exceptions, they can be had on every mile square, and are easily quarried.

The soil is generally rich, (not familiar with the terms of describing the component parts) some little mixed with coarse sandstone, very fine, with what I call isinglass sand. With common cultivation here, which is not very good, it produces from fifty to seventy bushels of corn to the acre, in ordinary seasons, and other crops in proportion. The mode of cultivation is the plow, and but little hoeing. Sometimes the land is plowed before planting; sometimes checked off and planted. Wheat is put in about the same way.

FRUIT. I have no experience in fruit growing, except in apples, pears and peaches; the latter not further than to grow from the seed, and but little attention paid to them. I am of opinion, with proper attention and care, it would be a good business here. I have raised as fine looking and delicious peaches as I ever saw or ate in any of the States west or south of Pennsylvania. The most of my trees have not been long lived, owing to the winter-killing, and destruction by the worms around the tree near the ground. The worm might be prevented, with proper care, I believe, but is more destructive than winter-killing. I have trees that are some twenty years old, that produce very good fruit of the kind, though they are very much decayed. In this locality I know of none that have attended to the cultivation of the peach further than myself. The result with them, so far as my observation goes, is about the same.

In the cultivation of pears, I have paid but little attention, and have had but little experience. There has been, perhaps, less attention given to them by my neighbors than myself. I have grown as delicious pears as I ever ate, but have been rather unfortunate in raising and perpetuating the life and growth of the trees. I believe, with proper care, they can be produced here advantageously.

I have had no experience in growing grapes. I have observed one or two instances where my neighbors have been eminently successful. Native grapes grow to great perfection.

From small experience and observation, strawberries do well. The wild or native strawberry grows in the prairie in great abundance and to great perfection.

Gooseberries of native growth grow in great abundance in nearly all the timber land; they are all I know anything about. When cultivated, they do as well as could be desired.

I planted a few of the red currants a few years ago; they have done no good; they have been entirely neglected. That may have been the cause of their failure. I planted in a rather low, damp situation; in more elevated, dry situations, I have heard of their doing well.

As to apples, I have no doubt there is no better locality for their production in the United States than this section. The same varieties that do well, as I understand, in the States east and north of here, are

entirely worthless here, and others that are not so good there, do well here. To name the best six varieties of one hundred trees for an orchard, is, perhaps, somewhat difficult; but from my present impression, I would suggest the following, provided they were for family use on the farm where produced. I would choose, when only six kinds, as follows: North Carolina Red June, 20; Summer Sweeting, 5; Summer Queen or Yellow Horse, 10; Yellow June or Sheep Nose, 5; Kinly Red, 20; Missouri Pippin, new variety, 40. In selecting twelve varieties, in one thousand trees, I would take North Carolina June, 10; Summer Sweeting, 10; Yellow June, 5; Summer Queen or Yellow Horse, 50; Green Fall Pippin, 10; Kinly Red or Lady Finger, 50; Missouri Pippin, new variety, 300; Brown's Neverfail, new, 50; Hutchinson Pippin or Scarlet, 25; new introduction, by myself, call it Simpson or Missouri Orange, 50; Rawle's Genitan, 300; Red Crab, only for cider, 250.

I would, situated as I am, and having the market which is accessible, make the foregoing selection; not that others might not be as good, and, under other circumstances, preferable. I know that many varieties that are said to be of the very best qualities in the East, so far as I have tried them, are almost worthless here; such as are of Missouri origin I find, generally, to be the most hardy varieties.

The worm that gets into the tree, at the surface of the ground, I have found, thus far, to be the most formidable destroyer of apple and peach trees. The only remedy I have found is the knife or the chisel. The blight, for the last two years, has been very destructive. I have found no remedy. I have found too much pruning very injurious. My experience is, that one year old trees are best to plant in an orchard, and let the branches commence not over one foot from the ground. The trees thrive better and bear better than with tall bodies, at least in all kinds of apples that I have cultivated.

Apples are about the only fruit that is grown here for market. Good varieties, last year and this year, were worth from fifty cents to one dollar per bushel in the orchards. What I have sold this season have brought one dollar. I sold all the well grown, fine apples I had last year at the same price; and I see no cause why, for years to come, fruit, especially apples and pears, will not command good prices on or near the Pacific Railroad, as we will have access to the St. Louis and Southern market, and also to the western territories in a short time.

Permit me to go a little further than your request, and say that this section of country was sparsely settled before the rebellion, and is much more so now. I don't suppose, for spring, summer or fall range for stock, it can be beat in the world. Timothy, herd grass, clover and blue grass grow to the greatest perfection. Last season I did not feed my stock, cattle or young horses, except, I believe, once or twice, when I gave them a few corn husks; they came out in the spring in fine plight, and cows that brought calves through the winter and early spring seemed to do as well, generally, as in midsummer.

I wish you would, when convenient, call the attention of persons wishing to make their homes in Missouri to this section. For agricultural advantages, I do not believe it can be beat on this continent. It is true that we have suffered, I suppose, as much from guerrilla warfare, of the very worst kind, as any part of the country; but everything for the past few months has been perfectly quiet, and, at present, land can be had very low, but it is rising rapidly.

Respectfully,

B. HORNSBY.

FRUIT GROWING IN TEXAS COUNTY.

HOUSTON, October 31, 1865.

L. D. Morse, Secretary State Board of Agriculture:

SIR: In compliance with your request in regard to fruit, I have to say, that I have resided here for seventeen years, and experimented to some extent in fruit. I sent to Rochester, New York, for my fruit; it does not succeed so well as our State fruit. As to the soil, I think we have that which is adapted to all kinds of fruit. We have the clay pan, rich, black loam, gravel and sandy loam. The grape has been cultivated here to some extent, and, as far as has been tried, succeeds well. The pear does well on suitable soil. The peach does well on high land or northern exposures. Fruit is not cultivated enough here yet to give any idea of the yield or profit. On the uplands a high state of culture is best.

The only insects that we have to contend with here are the borer and the leaf roller. Our remedies are to wash well with strong soap suds and smear well with soap during the months of May, June, July and August; in doing so we are not troubled with the borer. Whale oil soap suds, one pound to eight gallons of water, applied with a syringe, for the leaf roller.

So far as my observation goes in regard to the best bearers and growers, it is as follows: The Baldwin, Jersey Sweeting, Limber Twig (it is one of the best), Rambo, Golden Russet, William's Early Red, Early Strawberry, Fall Pippin, Yellow Bellflower, Rhode Island Greening, Westfield, Talman Sweeting, Roxbury Russet.

The gooseberry and strawberry do well here.

I will be glad to hear from you at any time.

Yours, respectfully,

J. H. HUBBARD.

FRUIT GROWING IN JEFFERSON COUNTY.

BY T. WALKER.

The following is a statement of the number of fruit trees and grape vines in Jefferson county, so far as ascertained. It no doubt falls far below the real number. It is a difficult matter, in many instances, to obtain the number of trees or vines; except some person interested were to traverse the county and obtain the number by actual count, the statistics will all fall short, such is the apathy manifested by many. They do not see the advantage it is to themselves or the country at large. It is doubtful if any county in the State is better adapted to the growth of various fruits than the county of Jefferson. There are old peach orchards that have not failed to bear good crops in from twenty to twenty-five years, until the summer of 1864, after the cold snap of January preceding. Most of the orchards have been too recently planted to make any statement of the product per acre; they are just coming into bearing.

The peach crop was large the past season, but rotted badly, owing to the extraordinary amount of rain. Most kinds of apples (those best adapted to this western country) seem to thrive well; of the late varieties the Winesap and Genitan appear to have stood the past wet season best.

Dwarf pear trees are largely planted by some, but it seems too early to say whether they will pay or not; they do well with some, however. Cherries in some places have been planted largely, but have not come into bearing sufficiently to justify any statement with regard to product. Small fruits have not been planted but in limited numbers. The Houghton gooseberry bears good crops, and the Wilson's Albany strawberry, though greatly neglected so far as culture is concerned, bears well.

Interest in the culture of the grape has begun to show itself in a way not to be mistaken; preparations being made in various quarters of the county for planting vines this fall and coming fall, indicate the faith of many in the hills of Jefferson county being adapted to the growth of the grape. No doubt can be entertained that the twenty-five or thirty acres will, in a few years, be increased to hundreds of acres. The vines in the few old vineyards are Isabella and Catawba. Isabella vines are being removed and being replaced by more reliable sorts. The Catawbas grown in this county are said, by a large fruit dealer in St. Louis, to be richer in saccharine matter than Catawbas raised in other States and other counties in this State, sold by him. The Concord is very largely planted, and will be this fall and next spring. Norton's Virginia seedling is next on the list in the number planted, but first for wine purposes. The Herbemont, Delaware, Taylor or Bullitt and Clinton have been planted in limited numbers. I am not aware of any other varieties being planted, except single

vines that have not fruited yet. In well prepared ground, where the vines get good after culture, the Concord, Norton's Virginia seedling, Herbemont and Delaware make very fine growth, and bear good paying crops; even the despised, and by some discarded, Catawba pays well; the fruit last season (from this county) sold higher than the Concord.

The following numbers show nearly what fruit is grown in this county; but the good work still goes on, and before long these numbers may safely be doubled, and even trebled:

Apples, 14,345; peaches, 30,070; pears, 8,150; cherries, 425; plums, 230; quinces, 850; total trees, 54,070, and some 30,000 grapes, besides a small quantity of small fruit.

CLINTON COUNTY.

PLATTSBURG, November 20, 1865.

L. D. Morse, Secretary State Board of Agriculture:

DEAR SIR: My orchard consists of two thousand trees, planted in the spring and fall of 1859 and the springs of 1862 and 1865. It is situated on a high prairie ridge, and is one and a half miles distant from the nearest body of timber. The soil is rich prairie loam, with clay sub-soil, producing this season fifteen barrels of corn to the acre. I have cultivated it in corn every year since the trees were planted. I have never manured or dressed the trees with anything. Those first planted I washed with soft soap one season. These I have measured since the reception of your letter, and find that the Ortleys and Dominies, measured six inches from the ground, average nineteen inches in circumference. They were four years old when planted in the orchard. All of my trees that were planted in 1859 bore, this season, a few apples; the Winesaps bearing most and retaining the fruit best.

The only insect that has troubled me is the borer. I have no remedy except to cut them from the trees. I searched for them this year once in August, once in September and once in October. The number destroyed by me this season exceeded, by one thousand per cent., the number killed in any previous year.

The gopher is much more troublesome and destructive than the borer. I have caught some of these in steel traps, but have destroyed more by planting, early in the spring, potatoes and apples poisoned with strychnine. I know of no other remedy, and this is but temporary, when successful, for our prairies and meadows are full of them.

For an orchard of one hundred trees, I would plant Genitan, Ortley, Limber Twig and Milam for winter, Fall Wine for fall and Rambo for early winter. Of my summer apples none have borne fruit except Carolina June. The trees are thrifty and the fruit is large and good.

For an orchard of one thousand trees, I would plant Genitan, Ortley, Winesap, Yellow Bellflower, Golden Russet, Limber Twig and Milam for winter, Rambo, Fall Wine and Fall Queen for fall.

Next spring I expect to wash the bodies of my trees with soft soap, and dress the ground for some distance around each tree with wood ashes. The washing, I am confident, from my experience, will be beneficial; whether the ashes will be I have yet to try.

Your other questions I cannot answer.

I am, very respectfully,

THOS. E. TURNEY.

CLINTON COUNTY.

NEAR CAMERON, November 6, 1865.

L. D. Morse, Secretary Missouri State Board of Agriculture:

DEAR SIR: I inclose, with this, a few lines that I have written in answer to your questions. If there is too much of it, you are at liberty to abridge it; I hope it will prove satisfactory. Although I have always been regarded as an enthusiast on the subject of fruit culture, I am not accustomed to write on it.

I noticed last spring that fruit trees bloomed three weeks earlier about St. Louis than with us; I send you a copy of a record that I have kept of the blooming of the apple since 1857:

1857....	first bloom May 15.....	full bloom May 18.
1858....	first bloom April 14.....	full bloom April 18.
1859....	first bloom April 25.....	full bloom April 29.
1860....	first bloom April 8.....	full bloom April 12.
1861....	first bloom April 22.....	full bloom April 27.
1862....	first bloom May 4.....	full bloom May 7.
1863....	first bloom April 20.....	full bloom April 27.
1864....	first bloom May 4.....	full bloom May 10.
1865....	first bloom April 26.....	full bloom May 4.

This does not include the Genitan, as that apple has averaged, during the nine years, eight and three-eighths days later, which is less than its friends generally claim for it.

I hope you have written to O. P. Moran, near Barnesville, in this

county. He has about one thousand grape vines, some fine hedges that will turn anything. From some Concord grapes, planted four years ago, he sold at the rate of six dollars per vine. With the aid of machinery, mostly of his own construction, and hiring to the amount of five dollars, he and his son cut and put up ninety tons of hay, in better order than any other in his neighborhood. But as I furnished you with his name, you will probably hear from him direct.

Yours, truly,

JOHN P. McCARTNEY.

FRUIT IN CLINTON COUNTY.

BY JOHN P. M'CARTNEY.

I have an orchard of about one thousand apple trees, planted from five to fifteen years, in Clinton county, two and a half miles south of the depot on the Hannibal and St. Joseph Railroad, section thirty-six, township fifty-seven, range thirty, on the summit and both sides of a prairie ridge, running north and south, with timber on the west. Native growth, principally black oak, with some elm, hickory and walnut; underbrush, sumach and hazel. Elevation about one hundred feet above neighboring creek bottom. Soil, prairie loam, from one to two feet deep; sub-soil, tenacious clay, with some sand and gravel.

For planting, prepare the ground by plowing as deep as possible; prefer trees two to three years old, with low heads, say from three to four and a half feet. Set twenty-five feet in squares, with the strongest side of the top to the southwest. Cultivate with corn, potatoes or vines (never any sowed crop), until the trees come into bearing, then sow in red clover; feed it off with hogs, or mow it and leave it on the ground. Prune but little the first four or five years, do that at any time; for older trees, prefer mild weather in February, to promote the growth of wood, and in June, to induce early fruiting.

ENEMIES. Rabbits are very destructive to young trees. Remedy, hunt them with dogs, catch them with traps or poison them; the latter mode I find most effectual. Put strychnine in apples on short sticks, where they frequent; to guard against accidents, put the apples out late in the evening and take them in early in the morning. Tent caterpillars have been numerous for several years past. Remedy, cut down all wild cherry and crab apple bushes near the orchard, destroy the clusters of eggs through the winter and spring, crush with the hand those that are overlooked, as soon as they are hatched and their webs are large enough to be easily seen. The past season has evidently been unfavorable to the parent moths, as very few clusters of eggs are

to be seen—not more than one to ten last autumn. A species of canker worm eat the leaves off of some of our trees last spring, but as they all disappeared as soon as the wet weather set in on the first of June, I am in hopes they too, like the catterpillar, will decrease or disappear altogether. They have been on the increase since 1860, the date of their first appearance in our orchards. Remedy, I know of none, except on small trees; shake the tree, and as they let themselves down to the ground by their webs, crush them with the foot. The borer is the worst pest we have to contend with; it soon destroys all neglected trees. I know of but one remedy, find and kill them. I have a shallow box, with a hoop nailed around it for a handle, to carry my tools in, to wit, a cooper's adz, garden trowel, a strong, sharp pointed knife, three-quarter gouge, and small flexible wire; as the trees have low tops, I generally get down on my knees, with the adz cut away the sprouts, if any are growing about the collar, scrape away the dirt and decayed bark with the trowel, then, if I find any signs of the borer, get after him with a knife. If it has cut into the wood, use the gouge and wire, but it is very seldom that I have to use anything but the knife, for it don't often escape until it cuts into the wood, which occurs the second season. I go over the orchard in September, and again in the spring, and if, at any time through the summer, I see the dust that the borer throws out, I get after him, for I am never in too big a hurry to hunt the "varmints."

THE APPLE CROP has been quite light this season. Good winter fruit is selling at from one dollar to one dollar and twenty-five cents per bushel in the orchard. Apple orchards, in good hands, pay well, and with the markets that we will have for many years, if not always, north and west of us, no one need be afraid of planting too many trees. One thousand trees for profit, twelve varieties: Fifty Carolina Red June; fifty Early Pennock; fifty Lowell; fifty Fall Queen: fifty Ortley; fifty Jonathan; fifty Dominie; one hundred New York Pippin; one hundred Winesap; one hundred and fifty White Winter Pearmain; two hundred Rawle's Janet or Genitan; one hundred Willow Twig. One hundred trees for family use, six varieties: Eight Carolina Red June; ten American Summer Pearmain; ten Fall Wine; twelve Fulton; thirty White Winter Pearmain; thirty Rawle's Janet or Genitan.

PEARS. I have not had much experience with this fruit, and that has been rather unfavorable; some of my trees have blighted badly the past summer. I saw a couple of small pear orchards this fall that were perfectly healthy and loaded with fine fruit. I have a number of varieties in bearing, but prefer the White Doyenne, either as a standard or dwarf, to all others.

PEACHES. We are near the northern limit, if not beyond it, of profitable culture of this fruit. Seedling trees, in favorable locations, have borne about two good crops in every five years; that is, we have had eight or nine good crops in the last twenty-two years. A few this

year, but nothing like a crop. Twenty miles south of us they had a tolerable crop. I have a number of budded trees that have been planted eight years, which have never borne a single peach.

CHERRIES. The Hearts and Bigarreaus are worthless; the trees winter-kill. Of the thousands of trees that have been sold through the country by Eastern tree peddlers, I have never heard of one that has borne a cherry. I find the Dukes, Kentish and Morellos quite hardy when budded low on the Muzzard or Mahuleb. One hundred trees, six varieties: Twenty-five May Duke; fifteen Early Richmond; twenty Belle de Choisy; twenty Belle Magnifique; ten Carnation; ten Reine Hortense.

PLUMS are not much cultivated with us. The trees do tolerably well, but the curculio generally gets the fruit. I have not had experience enough to make out a list of varieties.

GRAPES. Our high, rolling prairies, long, hot summers and dry climate, are well adapted to this most delicious fruit. The past season, wherever there was a vine it was loaded with fine fruit; no late frosts, rot or mildew, that I have seen. The Catawba and Isabella do well here by taking the vines down, and protecting them during the severely cold weather. The Clinton, Taylor's Bullitt and Concord are perfectly hardy. The Concord is a very strong grower and a great bearer, and is evidently the grape for everybody to plant, either for the table or market. Sold this season at from twenty-five to thirty cents per pound.

GOOSEBERRIES. Houghton's seedling is the only variety that I have fully tested, and find it hardy, vigorous and very productive.

CURRANTS. Our summers are most two long, hot and dry for this valuable fruit; it does best in a deep and moist soil. It needs good cultivation and mulching, which it seldom gets. As to varieties, I prefer the Red Dutch.

STRAWBERRIES. With good cultivation and a suitable season, this berry does finely. During the past three years the month of May has been so dry that the crop has been quite light. I have tested but a few leading varieties, and would give the Wilson's Albany the preference.

RASPBERRIES. I have never succeeded in getting a variety that would stand our winters unprotected, except the Allen, and it is worthless, as it has never borne a pint of fruit to the square rod. I shall try the Doolittle Black Cap and Purple Cane.

CAMERON NURSERY, November 1, 1865.

BARNESVILLE, November 5, 1865.

L. D. Morse, Corresponding Secretary State Board of Agriculture:

SIR: Your communication of October 19 is received and contents noted.

This part of Clinton county is a gently rolling prairie, composed of a rich, sandy loam, about two feet deep, underlaid with a seamy clay, through which water sinks from the surface. There is enough timber bordering on the water courses for firewood, building, etc., but our chief reliance for fencing is the Osage orange hedge, which is all that could be desired for the purpose. Our soil will yield seventy-five bushels of corn to the acre, when well cultivated, in a good season.

APPLES. My apple orchard was planted on fresh broke prairie in February, in 1854, on a northeastern exposure, thirty-six feet apart each way, and a peach tree planted in the center of each square between them. I cultivated my orchard for eight successive years in corn, leaving out four hills, or a space twelve feet square about each tree, which I kept mellow and clear of weeds. I washed them with soap suds every spring, and examined them for borers in September of each year. I have about forty varieties growing, but would not plant so many if I had to plant again. My object in planting so many was to ascertain what varieties were best adapted to this soil and climate. My conclusions are, if I was going to plant an orchard of one hundred trees, with six varieties, I would take the following: Red June, ten; Yellow August, ten; Horse Apple, ten; Rambo, ten; Fall Pippin, ten, and Janet, fifty. Our Yellow August and Horse Apple probably have some other names, as I cannot find them advertised under these names. If I were going to plant one thousand trees, with twelve varieties, I would add to the above Sweet June, American Summer Pearmain, Milam, Fall Queen, Yellow Bellflower and White Winter Pearmain. I would plant five hundred Janets, two hundred and fifty White Winter Pearmains, and twenty-five each of the others. I have had no diseases to contend with in my apple orchard, and no insects, the caterpillar and borer, neither of which is much trouble, as they are easy to destroy when taken in time, and the proper means used. Birds, particularly blackbirds, are the agents I employ to destroy such insects and worms as infest the tops of my trees. I take great care to protect and encourage them to build in the hedges and cottonwood grove that surround the orchard. It is the general opinion here that prairie land is not good for fruit, but I am convinced that the fault is not in the soil, but in its exposed situation. My orchard is eleven years old, and bore year before last, or when they were nine years old, about an average of five bushels to the tree. This season the Janets bore about five bushels to the tree, worth one dollar and fifty cents per bushel in the orchard, or seven dollars and fifty cents per tree. My other trees bore about enough for family use. Apples were never as scarce and high here before. Many orchards, even in the timber, had none at all.

PEARS. I have about fifty pears trees, and about twenty varieties, half dwarf and half standard. The dwarf are planted ten feet apart each way, and the standard twenty feet, and all kept well cultivated. My pear trees are free from any disease, nor has any insect or worm ever troubled them. The following varieties fruited this season: Angoulême, Louis Bonne, Beurre, Easter, Tyson, White Doyenne, Belle Lucrative, Lawrence, Sheldon, and two others, names unknown. All were good or promising, but I was particularly pleased with Tyson and Belle Lucrative. The Lawrence did not succeed on quince, but is a very fine standard, and bore the sixth year from the bud. One of my Sheldons broke from the quince root where it was about four inches in diameter, which surprised me, as it had made a fine growth up to the time it broke off.

CHERRIES. I planted Monstreuse de Mazel, Elton, Governor Wood, May Duke, Early Purple, Guigne, Buttner's Yellow, and two varieties of Morello, none of which have done much good except a Governor Wood budded on Morello stock, which is hardy and productive.

STRAWBERRIES. The Wilson is the only kind that I have fruited, and it has not proved very productive. I planted in rows two feet apart, kept them clean and allowed them to cover the ground. I protect them in winter by spreading straw or prairie hay over them. I planted a new bed last June, which looks very promising, but if they do no better than my first planting, I shall give them up.

BLACKBERRIES. The new Rochelle does well here, being hardy and very productive. The only cultivation they require is to keep the bushes sufficiently thinned out.

RASPBERRIES. I have the Belle de Fontanoy, Red Antwerp and common Black Cap, none of which are of much value. The Black Cap is the best. I have a yellow raspberry that is valuable, but I do not know its name.

CURRANTS. Currants do well here when planted in a favorable situation. I have the Cherry and common Red. There is a small green worm that is sometimes very destructive to the fruit, but I am told that white hellebore dusted on them will destroy them.

GRAPES. I have about thirty varieties growing, but have fruited only the following: Concord, Hartford Prolific, Diana, Delaware, Catawba, Isabella, Clinton, Rebecca, and a seedling from the Clinton of my own raising, that was ripe July the twentieth, or ten days before Hartford Prolific. It is about the size of Clinton, but a sweeter grape. It bore its first fruit this season, or the third year from planting. The habit of the vine is very much like Clinton, but the leaves resemble the Taylor. The Concord is much the best grape, all things considered, that I have tried. It is perfectly hardy, immensely productive, large, showy, sweet and good. The average produce of my four years old vines was about thirty-five pounds. I plant them eight by ten feet—ten feet apart in the rows, the rows eight feet apart. I train the first and second years on stakes, then put up substantial post and slat trellis, seven feet high—use three slats.

The Hartford Prolific is a fine early grape, hardy, free from disease, and very productive, but drops from the bunch when very ripe. The berries are nearly as large as the Concord, or about the size of Catawba. It commences ripening here about the first of August. The Concord is about ten days later. The Delaware is a nice, sweet little grape, tolerable productive, but is a feeble grower and subject to leaf blight. The Diana is very promising in every respect; the Rebecca moderately so. Catawba rots some, and is late and irregular in ripening. Isabella is comparately worthless. Clinton has not done well with me. The leaves have been affected strangely, being covered with small, hard lumps or knots, such as are often seen on the leaves of trees. The leaves were not so much affected this season, but the fruit rotted worse than any other grape—much worse than Isabellas standing next it on each side, on the same trellis.

This has been a trying season on grape leaves as well as on the fruit, but the lesson, if heeded, will be of great use to those who intend planting largely. The following kinds carried their leaves sound and healthy until frost, which kept off until the 27th of October: Concord, Hartford Prolific, Norton's Virginia, Cynthiana, Taylor, North Carolina seedling, Herbemont, Adirondac, Blood's Black, Rogers' Hybrid No. 1, Clara, Oporto, Allen's Hybrid, Perkin's, and about twenty of my own seedlings. The leaves of all the others suffered more or less, the Delaware as much or more than any other. The Isabella planted last spring made a growth of twelve feet, besides raising two layers; but notwithstanding its fine growth, its leaves were considerably affected late in the season. The leaves of the Cassady suffered nearly as much as Delawares.

My seedlings raised from a cross of the Concord and Catawba are very promising. My Concord grapes brought an average of twenty-five cents per pound in the St. Joseph market, or eight dollars and seventy-five cents per vine. An acre planted eight by ten feet contains five hundred and twenty vines, which, multiplied by eight dollars and seventy-five cents, would make an acre bring four thousand five hundred and fifty dollars. My Concord vines often bear from one to three bunches the first year after planting, from six to nine the second, fifteen to twenty the third, and this year, the fourth, averaged thirty-five. I have one thousand Concord vines planted now, and expect to plant all I can raise for several years to come. I shall plant other varieties, according as they please me on further trial. I am of the opinion that our prairies are the best grape lands in America; at least I have not seen or read of them being equaled in any other quarter. Our skirts of timber are tied together with wild grapevines, and our fence rows in the prairie are soon covered with them.

O. P. MORAN.

ST. CHARLES COUNTY.

WELLSBURG, November 20, 1865.

L. D. Morse, Esq.:

DEAR SIR: Your favor of the 30th of October I duly received, and in reply beg to say that I been cultivating grapes for the last fifteen years in St. Louis and on the farm which I now occupy. Came here in 1860, so I had to commence again. I do not cultivate for sale, but for my family use. In my humble judgment, I find the Norton's Virginia and the Concord first, and Hartford Prolific next. These I would prefer. There is such a number of varieties, I leave the rest to test and better judgment. It is a pity the Catawba should fail; I had half a crop this year of them, very large berries. The Isabella, no account. I raise on trellis, six feet apart. My farm is sandy soil, post oak timber, walnut and hickory. I know of no better land for fruit growing. I planted two hundred apple trees in 1860, many of which had fruit this year. Pears, peaches, quinces, etc., all do well here with me.

In conclusion, I will thank you for your report.

I remain, dear sir, yours, respectfully,

THOMAS LUCAS.

CLARKE COUNTY.

LURAY, December 9, 1865.

Dr. L. D. Morse:

DEAR SIR: I received your communication by last mail, and I hasten to give a few of my opinions, founded mainly on my own experience and observations. I hope they may reach you in time for the report of 1865. I hope to be able to add much valuable information to the pomology of Clarke county by December 1, 1866.

Fruit growing has been greatly neglected in our county, and scarcely any fruit but apples and seedling peaches were planted out until six or eight years ago. Also, a few common sour Morello cherries, Blue Damson plums, common currants and a very few Catawba and Isabella grapes. These fruits were generally poorly selected, (many of the apples being seedlings and sprouts from old trees; the cherries and plums most always from sprouts, and the grapes and currants from cuttings,) and still more poorly managed after planting.

Five to eight years ago marked a change, to some extent, in our desire for fruits. A desire for more and better fruits began to spring up. Peddlers and agents of Eastern nurseries, however, flooded our county, recommending and selling their popular fruits at the East, many of

which were tender and valueless here, and many did not find their fruits true to name when they came into bearing.

The common opinion now is that our county is as well adapted to growing fruits as any in this latitude, and I am of the same opinion, having formed it by an experience of thirty years in this county.

I have planted out a large variety of fruits, in order, partly, to test their adaptability to our locality. I am a pioneer in many kinds. I have over one thousand apple trees in my orchard, consisting of about one hundred varieties; about one hundred pear trees, consisting of ten varieties; six varieties of cherries, ten varieties of plums, two of apricots, four of budded peaches, twelve varieties of grapes, and several varieties of raspberries, gooseberries, strawberries, etc., etc. I shall be happy to give my experience with each variety as fast as time will develop their characters in our locality. There is not one-tenth enough fruit yet raised in our county to supply our home wants, therefore, my selections recommended now will be with a view to home use or home market. I recommend for most fruits a high location, facing the south or east, or the north will do, and has the advantage of late starting in the spring; but avoid western exposure here. Secure protection from southwest, west and northwest winds. Train to natural shape, viz: tall, spreading, round or pyramidal, according to the natural habit of tree; train to branch low, two or three feet above ground; prepare ground by plowing fifteen to twenty inches deep, (I did mine so, and have seen no symtoms of disease.) Plant young, stocky trees, with an abundance of roots, which cannot well be had to large trees. I prefer two year olds from root graft for apples. I planted yearlings, two years old, and so on up to five year olds, in the spring of 1860 and 1861. They are all, of every age, beginning to bear. The young are as large as the older ones, and all bore at the same time. They were all well mulched with long stable manure when planted, and have all had the same treatment. My choice, from present knowledge, would be about as follows:

APPLES. (7) Harvest, (1) Red June, (2) Red Astrachan, (8) Hightop Sweeting, Sweet Bough, (3) Maiden Blush, (4) Rome Beauty (9) Red Milam, (5) Rambo, (10) Winesap, (11) White Winter Pearmain, (6) Rawle's Genitan and (12) Small Romanite, for hardiness, productiveness and long keeping. Those with numbers prefixed, from one to six, for my selection of one hundred, and from six to twelve added for one thousand trees.

PEARS. (1) Tyson, Madeleine, (2) Bartlett, (3) White Doyenne, Buerre d'Anjou, (4) Sekel, (5) Flemish Beauty, (6) Winter Nelis, and perhaps others that I have not sufficiently tested to recommend. My choice for one hundred numbered same as apples.

PEACHES. All peaches are uncertain here, only giving a full crop about every third year. There are but few budded varieties yet. Large Early York, Field's Rareripe, Honest John, George IV, Oldmixon, free and cling, Heath Cling, etc., seem about as hardy as any.

GRAPES are certainly well adapted to our locality, nearly all native kinds yet tried seeming quite hardy and healthy. Even the Catawba, so liable to rot of late in other places, seems perfectly free here in most places. But I call the Concord *the grape*, notwithstanding the low estimate of it by Dr. Grant, of Iona Island, New York. The following have all been planted to a small extent, and do well: Concord, Delaware, Rebecca, Hartford Prolific, Catawba and Isabella. I think the last two will have to yield in time to other kinds. I have Dr. Grant's New Seedlings and other new kinds on trial.

The Early May is the most hardy and productive cherry. All plums do well when we keep the curculio off. Lawton blackberry fine. Several varieties of raspberries, very hardy and productive; American Red most so, perhaps. Houghton Seedling gooseberry best. Cherry currant best. In great haste,

B. P. HANON.

FRUIT IN MARION COUNTY.

CEDAR GROVE, November 18, 1865.

L. D. Morse, Corresponding Secretary State Board of Agriculture:

DEAR SIR: Your favor of October 27th, making inquiry in regard to the growing of fruit, etc., was duly received, and I reply at the earliest practical moment. My orchard covers an area of about forty acres, lies undulating and with a slight northeast exposure. The quality of the land is what the first settlers called poor white oak and hickory land, is situated about two and a half miles from the Mississippi river, and about one hundred and sixty feet above its level. The undergrowth of the surrounding land is black oak, white hickory, mulberry, ash, redbud, etc. I set out the first trees in my orchard (some five hundred) in 1850 and 1851. They were set out in rows, thirty feet apart. The land was plowed as for corn, and the holes dug about two feet by three feet in breadth, and eighteen inches deep. I then filled the bottoms of the holes with top soil, set the trees in them, with their roots spread in their natural order, and a little deeper than when in the nursery. I set out my second orchard in 1857 and 1858, about five hundred again, in adjoining land. The trees did not do well for the first and second years, and I think the cause of it was that they were injured in the nursery by the preceding cold winter. Since that time they have done very well. My third orchard, of four hundred and fifty trees, was set out in the spring of 1860, and to save land, I sowed spring wheat on the same land, which was saving at the spigot and losing at the bunghole. My

loss of trees from disease is about one per cent. annually. The cause is unknown. Those trees which die generally leaf out in the spring, and leaves soon wither. On examination, I find the bark at and under the ground to be soft and pulpy, as though it had been cankered. I have been unable to find any remedy for them. I have lost but one tree by the borer, and that was in it when set out. I wash my trees with a mixture of soft soap and lye, mixed with sulphur and hen manure, twice a year, and cultivate in corn, beans and potatoes, until the trees get too large. I have had but little blight in my orchard, and not two dozen nests of caterpillers on my trees since my orchard was first planted. My experience is, that my first trees were planted too close—thirty feet; the others were set out two rods apart. I set peach trees between the rows—a practice not very commendable, unless you set out large ones, at the same time of setting the apple trees; then they should be cut out after eight or ten years. The following I esteem a good assortment or variety for an orchard of one hundred trees, having tried them: Winesap, 40; Genitan, 30; Ortley Pippin, 20; Maiden's Blush, 4; Yellow Harvest, 2; Red June, 2; Rambo, 2. For an orchard of one thousand trees, I should select as follows: Winesap, 250; Genitan, 250; Ortley Pippin, 200; Willow Twigg, 100; Newton Pippin, 25; Peck's Pleasant, 25; Rambo, 25; Maiden's Blush, 50; Milam, 25; Red June, 25; Prince's Yellow Harvest, 25. I have in my orchard about one hundred varieties, but the above list embraces all of the profitable varieties that have been fully tested. I have many varieties that promise well, and the specimens are excellent, but desirable only for the amatuer. The White Winter Pearmain promises well. The tree is a very thrifty grower, but a "sty" when young. The Northern Spy is a great humbug. I have thirty-four trees, set out in 1854, and this year I got about five barrels of very fine apples, but they are ripe and gone, and they did better this year than heretofore. My Genitans and Winesaps, twelve or fourteen years old, that produced fruit this year, averaged about fifteen bushels to the tree.

I raised this year about one-fourth of a crop of apples and peaches, and for the encouragement of the timid man, or the man that is afraid to set out fruit trees, because the market would be glutted with fruit, I will say, that I sold this year one thousand and fifty dollars worth of fruit that I kept an account of, besides many bushels sold in small lots and given to friends. I began an orchard under adverse circumstances, principally for want of means, and also for want of encouragement; but now, that my orchard is established, I feel more than satisfied with my efforts and perseverance, and thankful that they have been crowned with such reward. Yet, when I began to set out my orchard, many of my friends and acquaintances thought I was a little crazy to undertake to establish an orchard for profit. With us, the fruit growing business is no longer an experiment; it is one of

the things accomplished. We can equal any locality in the Union for fine fruit, and have the best of markets.

Very respectfully,

O. H. P. LEAR.

HANNIBAL, November 18, 1865.

ESSAYS.

THE IMPORTANCE OF AGRICULTURE AND AGRICULTURAL ORGANIZATION.*

BY JUDGE CHARLES A. NEWCOMB, OF JEFFERSON COUNTY.

The object of creating this Board was to promote the interests of agriculture in the State of Missouri; and if anything I can say will, in the least, contribute to that great object, I will certainly be satisfied.

It is of the first importance, in carrying out the objects of this Board, to awaken an interest in the farming community on the subject of agriculture; without such an interest there will be but little improvement. We may have a clear intellectual perception of a fact or a truth, yet, without an earnest, personal interest in the success of that fact or truth, no beneficial results will be attained. When I speak of agriculture, I use the term in its most comprehensive meaning, and would embrace pomology, horticulture and all branches of the profession, for it is hardly possible to stimulate one branch without affecting all others; no one branch will prosper to any great extent while all others languish.

In agriculture, as in all professions, there is a science and an art. What I understand by science, in its simplest and most comprehensive meaning, is knowledge arranged. Art is the reduction of science to practice in the various pursuits of life; or, in other words, science teaches us to know, art to do. A man may be skilled in science and familiar with the principles of a profession, and yet be incapable of reducing his knowledge to practice. Such men are theorists, but are of no practical use in the world. But if we expect to see any beneficial results, theory and practice, science and art must go together; and this is eminently true in agricutural pursuits. Dr. Campbell says, "science is of but little use further than it is reduced to practice."

To inculcate the true principles of farming and encourage their adoption among the agriculturists of the State, are the objects of all our societies, and the end desired in all our efforts. Those arts that depended upon manual labor were, among some of the ancients,

* Read at the meeting of the Board, March 28, 1865.

termed "servile arts," in contradistinction to the liberal arts, as the former were practiced by slaves, the latter by freemen; hence the idea obtained that the pursuits of agriculture were not as high and honorable as other callings; and this false notion has prevailed to some extent in all ages, and reaches down to our own times and our own country. And this feeling will never be entirely removed until those who are engaged in this profession become interested in raising the calling to that dignity and importance that this great interest demands.

The people should be educated to believe there is at least as much honor and dignity in the pursuits of agriculture as in the learned professions, or in any other department of business, and that they are as remunerative.

The man who tills an acre of land, and does it well, and grows one acre of corn or vines, and uses all the aids of science and art to make that acre produce to its full capacity, is entitled to just as much credit and honor as that man who fills a chair of State and does it well. One has said that "he who causes two kernels of grain to grow where but one grew before, is a true benefactor of the race."

"Honor and fame from no condition rise;
Act well your part, 'tis there the honor lies."

Many young men enter the learned professions as a stepping stone to office; a desire to be "clothed with a little brief authority" is the "*alpha* and *omega*" of all their ambition. This is what produces that train of office-seekers that hangs like the trail of a comet on every new administration, national and State, asking for the crumbs that fall from the public table. And this morbid desire for office constitutes one of the great dangers to the free institutions of our country.

The farmer is independent; as Dodsley says:

"Fears no man's frown, nor cringing waits to catch
The gracious nothing of a great man's nod."

The profits of agriculture have never been understood. Let ten young men start together in life, five become farmers, the others enter professional life or some other department of business; the ultimate success of those five who entered the department of agriculture is more certain than that of the others; they will be more likely to accumulate a competency, if not a fortune, than those who entered other departments of business. And yet there is no profession or business in the State of Missouri so much neglected and that needs improvement so much as that of farming. There should be a united effort on the part of the friends of agriculture all over the State to organize county societies, auxiliary to the State society, and township societies to aid and coöperate with the county societies in getting up an interest in this great subject. In this way the improvements that have been made in farming and in agricultural implements would gradually

be adopted in our State, and the improvements in our farms and in the quality and quantity of our crops would soon be very perceptible.

I was strikingly impressed with the importance of agricultural societies in traveling, a few years since, through a neighboring State; one portion of the State had taken much more interest in organizing societies than the other, and had generally adopted the improvements of the times. In the other there were but few societies, and the interest taken in such organizations was very limited. The difference in the general appearance of the farms and crops, as well as the breeds and condition of the stock, was so great and marked as to excite the attention and remarks of every traveler.

We were talking of building a college devoted to agriculture. The National Congress has made a munificent donation of land to the State for that purpose; but we must remember that a building may be erected with all the splendor and beauty of modern architecture, and the chairs of that institution may be permanently endowed by the munificence of the rich, and yet it may stand a monument of our folly, rather than an evidence of wisdom.

Colleges follow in the wake of general culture and education. They are the outgrowth of the intelligence of the people. They only prosper when they come into being at the demands of advancing intelligence.

Hence we see the reason why so many colleges in our country have sprung into being, languished for a few years, and then expired.

Colleges are of slow growth. Generations were born and passed from the stage of life before Harvard and Yale were brought to their present perfection, and ranked among the first institutions of the world.

When the wants of the people demand it, we will be glad to see an agricultural college erected in our State that will vie in splendor and importance, with any institution in our country, and when these wants exist we will have the college. But it is a question worthy of our serious consideration whether the donation of land made by Congress to the State should be appropriated to building one institution, or whether it would not be better to use all our means and energies to the perfecting of a system of schools that would bring agricultural knowledge more within the reach of the great mass of the people, and would not the aggregate results be far greater?

It is urged that the times are unfavorable to organizing societies and awakening an interest in the subject of agriculture. This, to a great extent, is true. Agriculture is an art of peace, and, like other arts and sciences, does not prosper so well when the nation is disturbed by war, and especially civil war. But, in some respects, we think the times peculiarly auspicious for Missouri. We stand upon a point of observation, from which we can view the terrible past and behold old things passing away and all things becoming new.

Ideas that for a whole generation have controlled the public mind

and framed public sentiment are receding, and will soon be numbered with the things that were; new ones are taking their place, and are directing the public mind into different channels and new modes of thought. False systems, that have existed ever since Missouri was a State, are overturned in a day by the very causes that were intended to make them perpetual. A bright future rises up before us.

The most favorable change for the cause of agriculture in this State is the change in our system of labor. Slave labor is impoverishing to the soil. It never has and never will develop the resources of a State. This is sufficiently evidenced to every man who has traveled through the States of the South, and especially the cotton States. There he sees the fields and farms worn out under the exhaustive system of slave labor practiced in those States, and turned out to the commons. And this is true, to a greater or less extent, in every State where this system of labor has prevailed; but these fields and farms, under the energizing hand of free labor, will be restored to their wonted fertility, and will bloom to future harvests.

We are urged by the highest considerations of patriotism to encourage the pursuits of agriculture. An intelligent and educated yeomanry is the hope of the State. The calling is more conducive to patriotism and virtue than any other. The past and present prove this true. Cities are the great maelstroms of consumption, and are too often the hotbeds of vice and corruption. There is less intelligence and virtue in the city than in the country. President Edwards once said to a class of theological students who were in the habit, at times, during their course of study, of occupying vacant pulpits: "If you go into the city, take your best coat; if you go into the country, take your best sermon."

The peasantry of the Roman republics were the last who yielded to the degeneracy of the times; they remained firm and uncontaminated upon their hills and mountains, while Rome, the Eternal City, was a mingled mass of vice and dissipation that danced around the funeral fires of her liberty.

While we are glad to know that there are as true and devoted patriots in the great commercial metropolis of our own country as in any other city, or any portion of the country, yet it cannot be denied, but for the influence of the surrounding country, the moral and political influence of the Empire State would have been wielded against the General Government in the great struggle now being waged for the perpetuation of free representative government upon this continent.

The hard working yeomanry of North Carolina, Tennessee and Georgia, have never yielded allegiance to the Confederate States. Upon the altar of their hearts still burns the fire of patriotism, and they will hail with joy the return of the old flag of their country. The preservation of the virtues of the people is the true secret of national permanency, and whatever will promote this object should be guarded and fostered with the most jealous care by the Government. This is

the first great republic born in a Christian civilization, and founded upon the true idea that the sovereign power belongs to and inheres in the people. Such a political association contains the elements of perpetuity, and if preserved in their purity will never decay. But if they fail, then may we truly say, with Carlyle, "Alas! nothing will continue."

The cultivation of the soil was the first and is the most ennobling of all callings. When the first happy pair was created they were placed in a garden, the most delightful spot upon earth; their physical employment was its cultivation, their mental exercise to admire and adore the wisdom and goodness of God, that appeared in every shrub and plant that flourished throughout the garden. In this department of labor the whole realm of truth is spread out before us, and invites our inquiry and investigation. The composition of soils, the laws that govern vegetable life, are wide and pleasant fields for the exercise of the mind, and while contemplating and studying nature's laws, the mind takes a pleasing transit from nature's works up to nature's God. Cowper has beautifully poetized the sentiment:

"To study, cultivate, and with artful toil
To meliorate and tame the stubborn soil;
To give dissimilar, yet fruitful lands,
The grain, or herb, or plant that each demands;
To cherish virtue in an humble state,
And share the joys your bounty may create;
To mark the matchless workings of the power
That shuts within its seed the future flower,
Bids these in form of elegance excel,
In color these, and those delight the smell;
Sends nature forth, the daughter of the skies,
To dance on earth and charm all human eyes;
To teach the canvas innocent deceit,
Or lay the landscape on the snowy sheet.
These, these are arts pursued without a crime,
That leave no stain upon the wing of time."

Who stands in so enviable a position as the owners of the soil and producers of bread? They feed the teeming millions of our population; they supply their most pressing wants. Agriculture is the basis of all our material relations. More than one-half of the population of our country are engaged in tilling the soil, and over three-fifths of the permanent wealth of the country is in their hands. The prosperity of the country is based upon the prosperity of the owners and tillers of the soil. Truly, then, is agriculture the mother of all arts, the foundation and basis of every other calling.

Missouri possesses more natural advantages and adaptation of soil and climate for agricultural pursuits than any other State in the West or in any other part of the country. We have a soil and climate that will grow in the greatest perfection the peach, apple, pear and cherry, together with all other fruits that succeed in this latitude. While portions of the State are better adapted to the successful cul-

ture of the vine than any State in the Union, unless it may be California, we have soil well adapted to the growth of tobacco, hemp, cotton, and all the cereals and bulbous and tuberous roots grow to great perfection. And parts of the State are admirably adapted to sheep, mules and horned cattle. Missouri occupies a geographical position between the East and the West, over which the great thoroughfares of the nation must ever pass. She possesses the most healthy and salubrious climate that can be found in any of the States. And with all these, and many other untold advantages, Missouri is far behind her younger and less favored sisters.

This is a most favorable time to put forth an effort to make Missouri what she should be. We are in a transition state—we are passing out of the old into the new dispensation.

Many who feel that they cannot adapt themselves to the new state of things are removing to other portions of the country, leaving their farms to be cultivated by free men and free labor. Missouri is free. The incubus of slavery no longer hangs like a dead weight, retarding her progress, paralyzing her industry, and corrupting the morals of her people. While we contemplate with grateful hearts the truth that Missouri is free, we must remember that freedom was purchased at a great price. Ten thousand little grassy mounds scattered over every hard fought battlefield of this war, that hold the remains of our patriot dead, attest the greatness of the price that freedom has cost in Missouri. We, who are permitted to enjoy these dearly purchased blessings, would be recreant to our trust, and derelict in duty, if we did not use them for the improvement of our State, the benefit of our fellow citizens and the good of mankind.

> "We live in deeds, not years, in thoughts not breaths,
> In feelings, not in figures on a dial;
> We should count time by heart throbs; he most lives
> Who thinks most, feels the noblest, acts the best."

The man who improves and beautifies a farm does a permanent good to his country, benefits the race, and makes the world better for his having lived in it. And as one of our poets says:

> "And were this life the utmost span,
> The only end and aim of man,
> Better the toil of fields like these,
> Than waking dreams and slothful ease.
>
> "But life, though falling like our grain,
> Like that revives and springs again;
> And early called, how blessed are they
> Who wait in heaven their harvest day."

THE RELATION OF AGRICULTURE TO POPULATION.

ITS INFLUENCE ON CIVILIZATION.

BY JOHN F. MADISON.

The sublime order, beauty and regularity of the physical universe, as far as developed to the intelligence of man; the adjusted proportions of the animal and vegetable world; the co-relation and conservation of forces; the subtle energies of nature; the indestructible, yet ever changing form of the constituent elements of organic life, reveal the power of Omnipotence and fill our minds with awe and wonder. We see around us the wrecks of ages clad in the green and purple and golden hues of seed time and harvest, and recognize that the relic is to the past what the germ is to the future. Rightly presented, the events of man's historic period teach us that law is operative in each successive step, and the ultimate happiness of our race the final, though distant, catastrophe in the drama of life.

Knowledge is usually attained through suffering; our necessities urge us forward to the accomplishment of a high order of civilization; and as our primary necessity is food, the pursuit of agriculture becomes the most important and vital occupation in social economy. Art, science, literature and philosophy flourish in proportion to the existing means for the formation of brain and muscle; and the number and degree of happiness of the human family depend upon the productions of the earth. The records of the past, traced through varied sources open to research, indicate that a high order of civilization has never been obtained unless co-existent with a high degree of agricultural knowledge.

Food is the spring of action which has moved individuals or nations in their spread over the inviting portions of the earth's surface, and the prodigious waste of human life in the bloody struggles of five thousand years reveals the sacrifices made to secure this primary want.

The tendency of population is to double itself in twenty-five years, and in our own country this result has been demonstrated by every successive census. But in a state of barbarism, the supply of food being inadequate to the demand, starvation ensues, and death, through pestilence or war, is the ultimate check on the growth of numbers. An apt illustration is presented by the condition of the aborigines of America, who are wasting like snow before the warm spring sun.

"He that will not work, neither shall he eat," cannot be regarded as a vain threat; it is an immutable statute, and unsparing in its terrible force. The nomadic life of the Indian; his savage contests; his brutal passions, and his improvident idleness, checked the growth of his numbers before the white man placed a foot on American soil. The same cause, operating now, in presence of a superior race, will, ere long,

leave the dial plate of time to mark the extermination of the remaining tribes.

For centuries, the barbaric hordes of Europe wasted their strength in contests with each other, until, at length, gathering force by their numbers and their necessities, the storm burst over the heights of civilization, and China, Persia, Egypt and Italy were successively overrun. The vigor of the Roman arms long held in check the warlike tribes of the North, and the names of Marius, Cæsar, Drusus and Tiberius are associated with melancholy recollections, constrasted with the decline and fall of the Roman Empire at a later period, when Genseric, Alaric and Atilla scourged the land with their iron-hearted and remorseless cruelty.

When Rome became wealthy and proud she reduced her children of the soil to degrading slavery, and before the evils of that institution had culminated, she had to import slaves to preserve a stock of unprofitable laborers. What is still more remarkable, food had also to be imported into Italy, even where the most fertile territory might, with judicious cultivation, have yielded more than sufficient for the wants of the population. Thus crippled, when assailed by those hungry tribes from the north and east, Rome was no longer in a condition to repel their attacks. Bribes were at first given them to forego their incursions, and at last, not daring to trust her own slaves with the defense of the country, she began to incorporate the stalwart barbarians into her armies, vainly hoping to secure her ill-gotten wealth by the strength of a brave, but treacherous and uncultivated people.

The point of the wedge being introduced, it was driven home when the Goths, Franks, Alemanni and Huns poured like a torrent over different parts of the empire. Destruction ensued. Cities were rased to the ground; fields laid waste; harvest time passed without the gathering of crops; famine and pestilence succeeded, until, as described by historians, such were the horrors that mortality consumed a moiety of the human race. The blooming gardens and productive soils of Thrace, Pannonia, Gaul, Britain, Spain and Italy became like deserts. The cloud of invaders continually gathered fresh darkness as it rolled, and Europe was wrapped in chaos for a thousand years.

It would be a painful and weary task to trace the details of the successive throes through which the people struggled during centuries of misery. Necessity or a thirst for plunder and rapine spurred them to every species of cruelty. We see the adventurous warrior fastening his iron fangs on every spot where the fertile soil yielded the fruits of earth, and we see him wading through blood to ravage and subdue those who, through the influence of agriculture, had learned the arts of peace. Not until the lights of Christianity began to illume the darkened horizon, was strength consolidated to conserve the advances made in the culture of the soil.

If we turn more immediataly to our own times, and examine those peoples still dwelling in the confines of barbarism, we become shocked

at the acts of cruelty and oppression openly practised, and most probably resulting from pressing necessities, goaded by appetite. In their condition we must observe the relation food bears to population and intelligence.

The wretched inhabitants of Terra del Fuego, struggling to live in an inhospitable climate, covered with filth and vermin, have neither the means to mitigate their sufferings nor the power to increase their race. The aborigines of Van Dieman's Land spend their whole time in search of food. We can hardly realize the horrible severity of life to human beings roving along the seaboard to find a precarious meal of fish, which a tempestuous sea may have cast ashore. Their low stature, protuberant stomachs, high shoulders and slender limbs, their attenuated and diseased figures, with famine and ferocity depicted in the countenance, plainly indicate the absence of wholesome food. These and other inhabitants of the same latitudes appear to be in a worse condition than the brute creation. They are described as scooping large and filthy worms from gum trees, on which to make a repast; or, as climbing trees of great height, by notching the trunks with stone hatchets, after the smaller animals, or to secure the secreted honey of the wild bee; then as gathering the fern roots and ants and their eggs, which, bruised together, make some scanty meals in season. The brutal violence of passion, in seizing their wives by stealth, and their monstrous cruelty to them afterwards, coupled with the fact of child murder after its mother's death, attest the heartlessness of hungry tribes.

Passing on to the large islands of the South Sea, similar conditions of life are everywhere observable. Perpetual hostility of tribe against tribe, added to the custom of eating human flesh, kept the population from accumulating in numbers beyond the limited means of their subsistence.

The licentiousness of promiscuous intercourse and infanticide in the Society Islands, and other conditions and customs there existing, imply an effort to keep down population. The sad history of these people has been often told; but as the country is receiving importations of men from civilized communities of various nations, and as agricultural pursuits are fostered, the future may be more hopeful than the past would indicate.

If we pass in review the state of society in Africa—a country so abundantly gifted by nature—we find the evidence of barbarism coexistent with the neglected soil. Bloody and protracted wars, inhuman butchery of people, either from passion or fanaticism—the slave mart and its cruelties—all tend to the same end—a check on population. Forty days' provisions for a family will often buy a favorite child.

And yet this African race in our Southern States has doubled its numbers nearly every twenty-five years, notwithstanding the institution of slavery. The negro's progress in civilization, through the advantage of contact with a superior race and plenty of food, has been

so marked that the propriety of extending to him political franchise is seriously entertained in various quarters. Judged by his surroundings, his future, to say the least, is hopeful.

From savage life we turn to Asia, to different scenes; to more interesting records. These come to us measured in the sweet cadence of lyric poesy; in the dignified step of historic lore; or in philosophic acumen, embalmed by the hand of time. For two thousand years India has been, to a greater or less extent, a conquered country. Yet it has given the world instructors. Its wealth has enriched by turns the Syrians, Romans, Portuguese, Spanish, Dutch and English. The ruins of Palmyra and the gorgeous palaces of Portugal and Spain bear record of Oriental wealth; and the power of Britain is in part owing to her Eastern conquests.

Containing one-half the population of the globe, the fertile lands of Asia have to be economized with the utmost frugality to sustain the pressing wants of the inhabitants. Famines and pestilences, which so often afflict that land, are nearly always a result of a failure of the crops. To repress rather than to increase the population, seems to be the object of the customs that prevail in many parts. Celibacy is a distinction among the higher classes; and religious retirement, in monasteries and nunneries, is more considerable there than elsewhere. The brothers of a family often associate their fortunes with a single female, even among the husbandmen, whilst indigence and idleness are so common that multitudes of people frequently place their sole reliance on the charities to be abstracted from the Lama's bounty.

In China and Japan painful industry, in situations most favorable to the productions of the earth, is apparent; and the effort to keep production equal to population makes the pursuit of agriculture held in the highest veneration. The emperors themselves are its especial patrons, and have contributed greatly to stimulate activity by their personal supervision, and even work in the fields. They have written treatises on irrigating, manuring and tilling the soil. It is related of the Emperor Venti, who reigned one hundred and seventy-nine years before Christ, that he endeavored to stop the ruinous wars by engaging his subjects to cultivate their lands, and set example by plowing with his own hands the lands belonging to his palace. The emperor, the royal princes, and the chief mandarins assist in the spring at the national festivals, by voluntarily following the plow. They sacrifice to the gods to procure plenty for their subjects. The man whose lands are negligently cultivated is stigmatized with disgrace. There is little meadow or pasturage; the roads are few and narrow, and there are no common lands suffered to lie waste. Property is divided into small shares. It is said to be a common remark among the Chinese, that fortunes seldom continue in the same family beyond the third generation; and yet the accounts given us by travelers state that, notwithstanding the great sobriety and industry of the inhabitants of China, their prodigious numbers occasion much misery. There are some so

poor that, being unable to procure support, they expose their children in the streets. Mothers often destroy their offspring; parents sell their daughters for a trifle. In times of famine millions die of hunger. A Chinaman will often pass whole days up to his knees in water, digging and preparing the soil, and in the evening is happy to eat a spoonful of rice and to drink the insipid water in which it is boiled. From the extreme poverty of these people, and the miseries they endure, it is easy to account for their fondness for opiates. Despair begets callousness, and death would seem to be a relief from the horrors of starvation so often threatened.

The state of Japan is very similar to that of China. There are but few reliable accounts, and yet the plagues, famines and bloody wars of that country are familiar. A more resolute and warlike people than the Chinese, their passions are stronger; and their morality, though perhaps differing in character, is doubtless, in proportion, as great.

In the Turkish dominions and Persia, although the glowing pen of Gibbon has thrown a rich coloring over the descriptive scenes he has presented, we are nevertheless compelled to view the people side by side with the facts as they exist. The burdens and exaction of taxes, compulsory presents and other extortions, and the monstrous cruelty of the governing classes have reduced the best part of the population to live on barley cakes, lentils and water. In the mountainous regions, roasted or boiled acorns furnish much of the food consumed. Agricultural implements are scarce; a plow is often made out of the limbs of a tree. Where the predatory incursions of the Arabs are made, the crops, poor as they are, are not always safe to the husbandman. Hence it is that the population of Turkey rather decreases than multiplies. There, as elsewhere, want of food is a predisposing cause of the endemics and epidemics of Asia, which occasion such great mortality.

The adaptiveness of machinery to the wants of the people of Asia has not been understood; that enlightened civilization which has rendered Europeans conspicuous, has conferred but few blessings upon them, and despotism and anarchy, alike fatal to the cultivation of those distinctive traits that grace progressive improvement, have enthralled them in a physical and mental bondage as relentless as the grip of death.

Says Gibbon:

"The high lands that border on the Indian Ocean are distinguished by their superior plenty of wood and water; the air is more temperate; the fruits are more delicious; the animals and the human race more numerous; the fertility of the soil invites and rewards the husbandman; and the peculiar gifts of frankincense and coffee have attracted, in different ages, the merchants of the world. If it be compared with the rest of the peninsula, this sequestered region may truly deserve the appellation of the happy; and the splendid coloring of fancy and fiction has been suggested by contrast and countenanced by distance. It was for this earthly paradise that nature had reserved her choicest favors and her most curious workmanship."

The researches of archæologists and philologists of the present day

have ascribed to this region the birthplace of the human family. From thence was distributed those various migrations of men, beginning with the gray dawn of history. They spread out like a fan to the North and to the West, gathering force and power as they marched. The Celts, the earliest families of European history, are the connecting link to the Indo-Germanic stock. Those massive ruins of antiquity, called Druid temples, turn out to be no Druid temples at all—for the Druids worshiped in groves. Stone relics in the West conform in structure and appearance to the Hindoo temples in the East; and the peoples of Europe, whether regarded as Celts, Goths, Teutons or Sclaves; whether as Germans, French, British, Swede or Norse, all are fractions of the Indo-Germanic stock. The highly civilized European of this century is lineally descended from barbarians of one thousand years ago. Emanating from the East, as a common stock, and in their search after the necessities of life, the Indo-Germanic race may be likened to the waves of the ocean; sometimes driven placidly by gentle breezes towards the shore; at others rolling, wave after wave, in wild confusion; and again dashing upon the rocks, to be heaved back on the still advancing and angry billows.

Through the struggles that have intervened, the lights of civilization penetrated, softening, but often casting a lurid glare over a people in conflict with their sufferings. Oppression, gained by physical strength in the first instance, then maintained by wealth, aided by fraud and cunning, enchained the husbandman in semi-bondage. Tythes, taxes and imposts on agricultural productions kept him poor. The ages of the past, glossed over as "glorious," were really most unhappy to the people who then lived, notwithstanding the efforts of poet and painter to adorn them as days of chivalry.

The population of Britain, from the time of Julius Cæsar to Henry VII, had only reached three millions—a period of sixteen hundred years. Since that time to the present, three hundred years, the population of the same country has reached thirty millions, with perhaps twice that number of descendants, immediate or remote, in other lands. The soil was as fertile at first as last, but the progress of agricultural knowledge and intellectual refinement contributed to the happiness of the people, and production kept pace with population. The character of the political and religious institutions, there, as elsewhere, are molded principally by the energy and intelligence of the farming community. Whatever improvement is made is gradual. No sudden organic change can elevate a people from one extreme to another: and as the earliest wants of man are supplied from the soil, his earliest thoughts and aspirations are associated with it. His mind partakes of the health, vigor and activity of the body. A contrast is presented in the case of Bohemia. When the population of Britain was three millions, that of Bohemia was the same; and in the days of Ziska and Huss it was the seat of knowledge for Europe. Its libraries and scientific institutions and its wealth attracted the profoundest minds

and excited the admiration of the scholar and philosopher. The Thirty Years War ensued, and Bohemia was made a wreck, with less than three hundred and fifty thousand people. Her cities were swept away. Her fields were desolated. Her learning trampled on. Despotism, with hallow eye and bloated feature, has brooded over the ill-starred land for two hundred and fifty years. At this day Bohemia has three millions of inhabitants enthralled in superstitious bondage, and its name is a by-word of reproach for the indolent "Bohemian" of other lands.

When all the forces and disturbing forces are understood, a governing law may be observed in the physical and moral worlds, and experience teaches that when the material wants are supplied, the progress of every nation is proportioned to the liberality of its government; to the durability and strength of which a hardy yeomanry is indispensable. When each member of society becomes a part of his government, individual responsibility is increased and political freedom attained. The same in religion. As man stands before God amenable for his acts, his moral responsibilities are increased, and he is brought nearer to his Creator. On the other hand, as he is barred and circumscribed from the central government by the intervention of princes and nobles, or separated from God by the intermediate agency of a usurping priesthood, so is he deprived of his highest prerogatives and thrown back towards barbarism.

The character of a government in Europe will indicate the condition of the population. In nearly all cases we see the governments in antagonism with each other, and at war with their people, whose noble aspirations are so often repressed. The continent is parceled out into large monarchies, parts of it being "divided into small territories, commonly governed by absolute princes, who ruin their people by a mimicry of the greater monarchs in the splendor of their courts and the number of their forces." These separate and distinct interests lead to perpetual feuds and jealousies, and the natural increase of population forever presses hard on the supply of food. Still it is gratifying to find that the supplies have been more regular and abundant in the absence of war, during the last half century, than at any previous period. Under the benign influences of peace, agriculture has blessed and is still blessing the increasing millions. Waste lands have been subdued, barren places have been turned into productive fields, and enlightened laws contribute to render the social and political condition of Europeans more tolerable.

A profound and interesting reflection arises in the contemplation of those segregated elements now constituting Europeans, as they are being collected into one general body on our own soil. Viewed thus, we are the result of that emigration which started from Asia thousands of years ago. Our history here, different from that of other nations, commenced with civilization. We have neither myth nor barbarism to record. Columbus was only a pioneer to lead the way for millions who have crossed the sea boundary of our eastern coast. Surrounded

by every fortunate circumstance for contributing to human happiness, our increase of population has been overbalanced by the increase of production, nor does there appear to be cause for anticipating any immediate diminution of supplies.

The salubrity of our climate, the fertility and variety of our soils, the vast lakes and rivers spreading out in every direction, combined with the energy of character displayed by Americans, point to a glorious future. Our social, political and religious systems are free and generous, and well calculated to develop the advancement of the highest civilization. It must never be forgotten, however, that our responsibilities are equally great and important. Within a hundred years the population of the United States will probably be two hundred and fifty millions of souls. *And this is the halting place in the western march of nations.* Our area is broad enough for them, our soil is rich enough, and our system is adapted to the full development of their manhood. The nations we have left behind will look to us with anxious solicitude, for it may be fairly assumed that the problem of human destiny will be solved on the American continent. Hitherto the advanced guard of western emigration has had the front rank in intelligence and actual power. Contrasted with other nations, Americans are no exceptions to this general rule. Our railroads, steamers, telegraph lines, our adaptive faculties in making the most of materials within reach, are alike creditable to the farmer, merchant and artisan. The great work which is to bind our eastern and western frontiers is already in progress, and a line of steamers is about to be started connecting the East Indies and China with our Pacific coast. A short time will elapse ere we are brought within easy reach of the bright Orient, the birthplace and starting point of our remote ancestors. San Francisco, St. Louis and New York will rival each other in size, affluence and energy, when their merchants compete with the world for the commerce of India, China and Japan. It is not, perhaps, too much of speculation to say that, viewed by the light of evidence presented, the curtain is about to rise on the last act of the grand historic drama in which unity of the human family is to be displayed and the ultimate happiness of mankind achieved.

In contributing to such a result as this, the importance of agriculture to the nation is at once apparent. The future, with anxious gaze, points to the millions who will require food. The agriculturist must bring science to his aid, and worn out fields should be as obsolete as the divine right of kings. Science has done much, by the introduction of machinery, to assist the farmer in his labors; but science has done as much in other occupations. It is in this particular that the present differs so much from the past. In the accomplishment of work, measured by the standard of man's eapacity, the machine power of England and America is more than double the whole population of the globe. What the agriculturist requires, is a knowledge of science as applied to the soils. By this alone can the fertility of the fields be

preserved. If crop after crop be removed without giving back to the soil the nutriment abstracted, exhaustion will as surely follow as night to the day. In all her energies nature demands conditions before she can yield her crops. In the animal and vegetable worlds, the exchange must be equal, or both suffer in a proportionate degree. Their relations are absolute. Poised between them, a few inorganic elements, the chief of which, carbonic acid, hydrogen and ammoniacal salts, aided by the light and heat of the sun, combine to produce the varied forms of vegetable life, from the blade of grass to the giant oak. Take away any one of them, and the rest are powerless for their special purposes.

Our cities are the hives of animal industry. Their inhabitants absorb the produce, without returning the materials to the localities whence derived. The valuable manures, inestimable, perhaps, in the future, are carried off by drainage to the rivers and lost in midocean; or they are used to fill up the hollow spaces and breed fever and pestilence in our midst. It is thus that man's folly neutralizes the beauty and order designed by a wise and beneficent Creator.

Within a few miles of St. Louis the soil is so poor that a crop of grain cannot be depended on, and yet the city is literally choked with material that would make these lands rich and prolific. In many of the Western States exhaustion of soil has already commenced.

To correct these evils is the special duty of the agriculturist. On him and his efforts rests a responsibility greater than on any other class of people. The life and prosperity of the nation depend upon him; time will hold him to a strict accountability. As the past is displayed before him, it points with unerring accuracy to the causes for the rise and fall of nations, and tells us that population and production are in absolute relation to each other, while civilization itself is greatly influenced by the success of scientific agriculture. His is a noble occupation. The glorious sun, unimpeded by the dust and smoke and impure atmosphere of cities, welcomes him to his repast, and its evening shadows shed a pleasing influence around him. Happy with his family in the cherished homestead, his wants are well supplied by the affluence of nature. Mankind asks him to be intelligent as he is industrious; to be wise as he is kind; and as his deserts are, so will be towards him the feelings of his fellow beings in other pursuits of life.

THE DOG PEST.

BY B. SMITH.

It would seem to require but little argument to establish the prin-

ciple that our people should hold out especial encouragements to that class of productions on which the material prosperity of our State depends.

Clothing is among the first necessities of any civilized people, and measures for obtaining it in the cheapest manner are essential to their well being. It would seem that we were careless of that first law of our nature (self-preservation), did we fail to protect every means of getting cheap and comfortable clothing for our people and for ourselves, and to restrain within the narrowest possible limits any species of property that might interfere. The first requisite in the production of suitable clothing, for a large part of the year, in this climate, is wool. The next is suitable means for converting the wool into cloth.

The State of Missouri has many thousand broad acres of land well adapted to sheep husbandry, on which the grasses are yearly growing, dying and going to waste for the want of suitable flocks to convert their juices into healthy food and animal fibre for the production of clothing. We have, also, many rapid streams adapted to hydraulic purposes, on which might be built manufactories sufficient to furnish clothing for a nation. Our climate is healthful for man and beast; our soil sufficiently productive to feed the operatives in a thousand factories. There are many thousand dollars of waiting capital that might be invested in the production of wool and building the factotories. Why don't we have them? The dogs kill our sheep, and wool growers have been compelled to abandon the business and try a less lucrative, but safer business, in raising something that the dogs cannot kill. What is to be done? The contest lies between the dogs and the sheep. Our people want clothing, and many of them are unable to procure it from the Eastern States, at the present high prices. We cannot have sheep enough to supply wool for factories while the dogs are under the present kind of rule, or, rather, want of rule. We must cultivate a breed of dogs that wool grows on, or restrain the dogs and raise sheep.

Our people have heretofore been pioneers, and have felt that dogs were a necessity to a pioneer life. But the time for pioneering in Missouri is past. We must become a civilized people. The practice of the hunter must now give place to the arts of civilization. Instead of wandering in the forests in pursuit of the coon, fox and opossum, we must now cultivate broad fields of waving grain and grass. The animals that are henceforth to monopolize our attention are blooded horses, cattle, sheep and swine. Agriculture, horticulture, mechanics, commerce, manufactures and mining must take the place of the pursuits of the backwoodsman. Ours is the central State in the Union—the real keystone to the grand arch. Those who will continue the pursuits of the savage must go to savage wilds to do so. The broad prairies and green hillsides of Missouri have another, a higher destiny. Our noble Constitution is sifting out rebel sympathizers from among us. Would to God it could sift the dog sympathizers away,

too, and not have two States spoiled with their presence. The statistics of our State have been so kept that we cannot tell the exact number of this canine incumbrance. What damages they have committed; how many sheep they have killed; how many maimed; how many lawsuits produced; how many human fights have been caused by dog fights; how much property has been destroyed by mad dogs; how many men, women and children have been bitten by dogs; how many poor humans have been forced into a premature grave, through that horrid avenue, hydrophobia. All this our dog-fancying officials have failed to show us. We shall be compelled to go to the records of more enlightened States to form an approximate idea of the cost of our dogs. In Cayuga county, New York, a population of fifty-five thousand had thirteen thousand dogs—nearly one dog to four inhabitants. In our State they will be more—say one to four. In 1860 Missouri had a population of one hundred and eighty-two thousand and twelve people. One dog to four of this population would give two hundred and ninety-five thousand five hundred and three dogs. Suppose the cost of keeping a dog to be three and one-half cents per day (it will average much more), and this would be twenty-five cents per week, or thirteen dollars per year. This sum paid each for keeping the two hundred and ninety-five thousand five hundred and three dogs would amount to three million seven hundred and forty-one thousand five hundred and thirty-nine dollars.

The farmer who raises his own bread and meat cannot realize the cost of his dog's board, but the poor man who visits the market every morning for his daily food, and pays fifteen dollars per barrel for flour, twenty cents per pound for steak, and seventy-five cents for butter, and has had the cost of every mouth depending on him, it is pictured to his imagination with fearful distinctness. But suppose the cost of the dog's daily meal had been fed to a thrifty pig for a year, don't you think it would have made more than one hundred pounds of pork? Or had it been fed to the poor, starving cow at the door, how much more regularly would she have come home, and how much richer would have been the returns for the care. In either case the little children would have been the gainers by the change, and our State saved in the aggregate more than three and a half millions of dollars—quite sufficient to build one hundred and twenty miles of railroad, or to buy one and a quarter millions of sheep, or to build seven first class woolen factories. There were in this State, in 1860, six hundred thousand sheep.* Now, suppose that in that year one sheep in twenty was killed by dogs; that would be thirty thousand sheep, worth, say two dollars and fifty cents per head, would be seventy-five thousand dollars. Suppose that one sheep was maimed for every one killed, and damaged, say fifty cents each, here again would be fifteen thousand dollars. Now, suppose we put all the damage caused by dogs to every

*The number of sheep in Missouri in 1860 was 937,445.—*Corresponding Secretary.*

other kind of property, cattle bitten, hogs worried, eggs eaten, gardens destroyed, etc., etc., to be as much as that done to sheep alone, and we have ninety thousand dollars more against the "*varmints.*" But when you come to charge them with all the losses accruing to our State from the discouragement of sheep husbandry (which is chargeable to them alone), and to the necessary additional cost of keeping sheep, when they are kept; say for building yards for nightly folding and for the daily trouble of driving up the sheep to the fold, and for the discouragement of woolen factories, that we would have had if we but had the wool, you will carry the account of pecuniary damage to Missouri alone against the worthless curs, or curses, to many millions of dollars annually. But when you charge them with the nine annual deaths by hydrophobia in St. Louis alone, and say an equal number for the remainder of the State, you have to add eighteen lives lost annually by that most terrible of all deaths, one of which would be of incomparably more value than all the dogs in this or any other State.

Now let no man say that the discouragement (of this dog pest) to sheep husbandry is overestimated. I can name several persons in my own county, when asked, "Why don't you keep more sheep?" reply, "I would but for the depredations of dogs." One says, "I lost in one night fifteen sheep by two worthless dogs." Another, "I lost six sheep from a flock of twelve." Another, "I lost seventeen killed and six bitten and nearly ruined." Add this to my own experience of sixty-seven sheep killed by dogs in one year out of a flock of less than three hundred. When I quit the sheep business I raised animals that the dogs could not kill, and that is the way a majority of sheep raisers are compelled to do. Could this hindrance alone be removed in Crawford county, our sheep might run with safety in the woods from one end of the season to the other, and our flocks would be increased with great rapidity.

The remedy that I propose is taxation. Our Constitution requires that all property shall be taxed according to its value. We shall have to depend on the license system, and make it unlawful for persons to allow their dogs to run at large, except by virtue of a license to the owner of not less than one dollar for the first male dog, and two dollars for every other male dog over two months old, and two dollars for the first female dog, and five dollars for every other female dog over two months old.

It is needless to say anything in favor of taxation in these taxing times. Why tax the sheep and not the dogs? Why tax the occupations of agriculture and manufactures and not the sportsman and the hunter? Unless you wish to discourage sheep husbandry, why tax the sheep and let the dog go free? Why offer a premium to make the broad lands of Missouri a hunting ground, instead of a delight to the agriculturist? Why compel the agriculturist to pay a tax on the sheep of his own raising and on the dogs of his neighbors' raising?

Why not give the sheep business at least as much encouragement as you do the dog business? Why have they not been taxed? Solely because the man who owns a dog owns a vote, too, and the men we send to the Legislature have not independence enough to do right.

This outrageous treatment of the most important interests of the State has been presented to our last General Assembly without avail. They fear to touch the dog. Cannot the friends of agricultural improvement and universal progress in this State exert as much influence in our legislative halls as the sportsman, the hunter of coons and opossums and the fancier of dogs?

Let us make our will known to them, and if they fail to do their duty in this matter, just let them stay at home next time and take care of the dogs, while we send friends of agricultural progress to make our laws.

MISSOURI MINES.

BY ED. MILLIGAN.

The rich mines of useful and, perhaps, precious metals in Missouri, have often been referred to in general terms, yet in a very indefinite manner, and for this reason not one-tenth of the richest mines are yet known, or even discovered; and to-day there are thousands of acres of good mineral lands offered for sale at a merely nominal price, in which will be found rich mines enough to make large fortunes; yet neither the seller or buyer knows anything of these facts.

Added to her vast mineral and agricultural wealth, mild climate, noble rivers and central position, all most inviting to the industrious immigrant, we have good reason to believe that large paying wells of petroleum will be found in Missouri.

Before anything was known of this rich source of national wealth, we traveled from Warsaw to Osceola, Missouri, and were then strongly and forcibly impressed with the strangely irregular hills along our route—they, from their great irregularity, having the appearance of being formed by some great convulsion of nature. Since the discovery of oil, a recollection of them was brought back by articles in Forney's *Press*, describing the oil region of West Virginia. The description there given was precisely similar to the country along the Osage and in St. Clair county. Hence, it is fair to infer that oil will be found there, and in paying quantities. Though some good indications of oil have been discovered in North Missouri, in our mind the largest and best wells will be found south of the Missouri river. Little of practical scientific information has been published touching

the origin or formation of this new and necessary source of wealth; only this much is certainly known, that where petroleum is found, three essential elements to its formation or production have previously existed there, namely: coal, salt and lime. How these combine in the deep laboratory of nature to form this necessary and valuable oil, is not explained in any article we have read or heard of, and if known, the explanation is most carefully kept secret. Hence, science has done absolutely nothing in the direction of locating these deposits and explaining their origin.

The yield of oil at this time is not less than twelve thousand barrels daily, and yet the price advances rather than lessens. With each new discovery of oil a new use is also discovered for it, until it is now used for many and various purposes other than light. The foreign and home demand for and consumption of it is rapidly increasing. For these reasons it is, in our opinion, the duty of the State authorities, by all and every proper and legitimate means, to institute, prosecute and encourage such explorations and inquiries as will lead to the discovery of this rich and valuable source of State wealth. Any sum which the State may expend to encourage such discoveries will soon be repaid by taxes arising from the greatly increased value of the lands. Again, the counties to whom was given (most unwisely and improperly) large tracts of so-called swamp lands, should be required, as some small return for said gift or grant, to have a carefully prepared topographical and geological survey of their respective counties made, and by some practical man; not, as heretofore, by a theorist, dealing in splendid generalities and carefully avoiding definite practical information.

Missouri has suffered much too long, and it is full time every effort was made to place and keep her in that position for which nature intended her, and of which slavery and compromise so very long deprived her. There is one other article essential to the prosperity of St. Louis—that is anthracite coal. It is believed that can and will be found in what is known as the Ozark ridge or mountains. Its early discovery ought to be encouraged; its use would greatly lessen the cost of iron castings.

Finally, we trust the coming Legislature will so far forget political squabbles as to give some time to the true interests of Missouri and her greatly needed material prosperity.

Will they do it?

SOUTHWEST MISSOURI:

ITS ADAPTATION FOR STOCK AND SHEEP RAISING.

BY ED. MILLIGAN.

The history of Missouri, since her admission as a State of this Union, is peculiar, and without a parallel in this or any other country. Seeking admission soon after the invention of the cotton gin, which had greatly and rapidly increased the value of slave property, the great leading nullifier, then in the War Department, foreseeing this apparent great advantage, and its certainty to add to the number and strength of slave States, turned his attention to Missouri, and found but too many ready and pliant tools to his purpose in the "doughfaces" then in Congress. The efforts of a few faithful and true lovers of liberty proved unavailing. Missouri had thus, by "compromise," the dark pall of slavery forced upon her, and, to close the door of further immigration west of her, this same Secretary of War placed upon the western border an "Indian wall," where no white man dare go, except by sufferance—none as a right. Thus Missouri became the first battle ground of slavery, when the slave power won; and that made and kept Missouri comparatively a wilderness for forty years, the emigration to her borders being chiefly from the slave States, most of them of that class known as "poor white folk"—indolent and profoundly ignorant, intensely pro-slavery, and constitutionally opposed to all kinds of intelligent improvement, either mental or physical.

The slaveholders, with their chattels, as was their wont everywhere, appropriated the rich lands contiguous to the Missouri river, and on both sides of it, leaving the southern portion of the State to be entered upon by their willing aiders—the poor whites—who had few, if any, human chattels. Thus Missouri, richer in all the useful minerals, possessing more water communications, and having a far milder climate than any of the new States, had emigration turned from her soil to seek a home in a less inviting, yet free territory.

From this cause her rich mines are even yet only partially worked, and nine-tenths of her vast mineral wealth is unknown to any one, however well informed, and hardly thought of by a large majority of her people. The second battle for slavery in perpetuity and everywhere, was inaugurated with rebellion, and most actively pursued by the rebel leaders in this State, carrying with them, in search of their "rights," some sixty thousand young men, two-thirds of whom could neither read nor write; a large portion of the remainder madly urged on by their love of the "institution." Over twenty thousand of these victims of slave power have found their rights, and returned to plague Missouri with their stolidity and ignorance.

The efforts of the Gamble dynasty to foster slavery in Missouri is well known, and needs no comment.

The radical advocates of freedom faithfully and fearlessly marched.

The late Convention at once and forever declared Missouri free. That same Convention also laid the foundation for a far more noble work—the mental freedom of the white man, and requiring an intellectual qualification in all of her voters after 1870. This will fully compensate Missouri's loss in 1820, and will forever place her as one of the first States, socially, morally, commercially and intellectually.

The reflections we have here attempted to describe, and perhaps some much stronger, forcibly presented themselves for our consideration during a late trip which we made on and along the Southwest Branch of the Pacific Railroad. The country through which we passed, commencing in Franklin county, and passing through Crawford, Phelps, Maries, Pulaski and Miller, to the Osage, and along the eastern bank of that river to Osceola, is, in our judgment, unsurpassed in any country or climate as a stock and sheep raising country. It is emphatically a grazing country—gently rolling, with an abundance of fine water. The timber is not close, so as to injure the grass, and at the same time affording to the stock (especially sheep) protection from the oppressive heat of the summer or the chill blasts of winter. The grass is of a richer and more nutritious kind than is found upon the open prairie, and for this reason these lands are far preferable, for the purposes indicated, than are large prairies. The winters are more mild, and hence there is a necessity for less winter feeding than in any of the wool-growing States. Add to this, it is the testimony of wool growers that sheep increase greatly in size in this State. On the land under consideration, a pound of good, rich, nourishing mutton can be raised fully as cheap as can a pound of pork, in which there is comparatively little nourishment, and that of the grossest kind. We are sometimes led to believe that there is some strange affinity between slavery and swine, and that the unclean spirits, long years since cast out, have, in our day, returned through swine to infuse into their voracious consumers the unclean spirit of rebellion. We would like to have the opinion of some of our non-juring clergy on this point. It is certainly one well worthy of their consideration. The counties we have named could, without in any way interfering with their agricultural or mineral lands, furnish sustenance to millions of sheep and cattle.

There is, also, in the counties named and in the counties further south, the richest mines of the useful metals, with the best and most numerous water powers, not only to manufacture these metals, but also to drive the necessary machinery to manufacture all the large yield of wool into cloth, thus very largely increasing our productive industry; and as active, industrious and intelligent immigrants flocked in, a home cash market would be found by the farmer, wool grower and manufacturer, and render unnecessary the importation of cloth from New England, or butter and cheese from New York and Ohio. With cleanliness and intelligent industry, the latter articles can be furnished rich in quality and abundant in quality.

There are indications that active operations will commence on the Southwest Branch of the Pacific Railroad at an early day, and that it will be pursued to early completion. This ought to have been, and we have authority for saying could have been done nine years since, if not for the "penny wise and pound foolish" policy of its President in 1853. Then it could have been built at half the cost it can be now. Even now, any company undertaking to finish it for its lands will be sure to make money. This portion of Missouri is well worthy the early attention of all immigrants in search of pleasant, comfortable and healthy homes, where land is now cheap and plenty, and as such we recomend it; and as the railroad progresses, the million of acres yet owned by it will be brought into market. In our mind, the day is not distant when Southern Missouri and Northwest Arkansas will be the garden spot of this great continental Republic. Her hills covered with orchards and vineyards, her valleys teeming with cereals, whilst the lowing of cattle and the sound of anvil and hammer will make it a scene worthy to be looked upon, remembered and admired as the happy home of an intelligent, industrious, free and happy people.

HAY MAKING.

BY S. SMITH.

Among the various occupations of human industry, no one has been pursued with less skill and enterprise than farming. It is true that we see almost every day some improvement in the machinery used, and there is no doubt that the adaptation of means to ends is better understood, so that progress in this respect is constantly being made; but it will also be found that almost all this invention of machinery, this progress in the science and art of farming, is not made by farmers, but by those engaged in other pursuits. The question may well be asked, why is this? The answer undoubtedly is, that the occupation of farming is one in which the gains, though moderate and more certain than those of the mechanic and merchant, are to be realized amid much less excitement and strife than are incident to the life of the latter. The impression on the public mind has hitherto been that farming required little thought; that the routine was so regular and constant that any man, though a fool, need not err therein. But like many of the traditions of antiquity, this is passing away, and it is beginning to be seen that to obtain the highest results from the culti-

vation of the earth, requires more scientific skill than almost any other of the pursuits of life. Our whole nation, too, is awakening to the necessity of providing the means for encouraging the practice of research into the hidden mysteries of nature, as developed in the growth of plants, and thereby elevating the standard of mental cultivation among the tillers of the ground. We provide schools and colleges for the express purpose of teaching our lawyers and doctors to think, and why not do the same for our farmers? Why not have the operations of the farm carried on understandingly, and with as clear an appreciation of cause and effect as in the business of any other department of life?

These few remarks on general principles have been made, because we believe that no department of agriculture has been conducted with less thought than hay making. Many seem to think that if hay is so dry as not to mould when put into the mow or stack, it is all that is desirable. This is far from being true. Drying hay is not curing it, any more than picking the leaves from the tea plant and drying them would be making tea. Hay is as effectually spoiled by being exposed too long to the hot sun, as it is by being wet. Many of our farmers, however, do not seem to be aware of this; they cut their grass, and if the weather is fine, let it lie several days, or until they are ready to dispose of it. In this way it is often so dry as to crumble into dust. In such a state it is not only unpalatable to animals, but the nutritive properties are evaporated, and only woody fibre left. Much has been said and written about the proper time in which to cut grass, so that it may make the best hay. All are agreed that this should be done when the nutritive properties are most completely developed, and before the stalk has passed into the woody state, which it does after the seed is perfected. During the process of ripening, starch and sugar, which are the principal nutritive agents in all vegetables, are most extensively deposited. In some stages of their growth, many plants contain an acid which, in a ripe state, is transformed into sugar. This is particularly observable in the grape. After ripening, the starch and sugar undergo another change, and disappear; consequently, it is of the utmost importance to seize the moment when all the nutritive qualities are in the highest state of development. It is difficult to determine when some grasses are ripe for cutting, but timothy affords a decided test. While the stalk is growing, a slight pull will cause it to part at the joints; as it ripens, it will part with more difficulty, until, finally, the plant will come up by its roots before the stem will break. As soon as this state is reached, or a little before, haying should begin. Clover furnishes no decided indication of maturity, and much judgment is necessary in order to determine when it is in a proper condition to make the best hay. The dryness of the season, the luxuriance of the growth, and a variety of other circumstances must determine this. If the season is very dry, the cutting should commence early, as soon as the first blossoms begin to turn

brown, otherwise, as many of the plants will reach complete maturity, much will be lost by over drying. On the contrary, if the season is favorable, the cutting may be delayed, because even if the plants are ripe they will not change for several days, and, in the meantime, the undergrowth will be much increased. As a general rule, the time to commence mowing is when about half the blossoms have turned brown. If any error is made, it had better be in beginning too early, because any delay is then an advance towards the right time; whereas, in commencing too late, a bad matter is rapidly becoming worse.

Having decided to begin haying, the next thing is to conduct the process with due regard to the making of the best hay, together with the utmost economy in time and labor. Nothing is gained by mowing when the grass is wet; it takes just so much the longer to dry it and the hay is not so good. You had better do something else at such times, and wait until the dew is off, then you will have very little trouble in curing your hay in a proper manner. It should be kept constantly in mind that the less grass is exposed to the weather, whatever that may be, the better will be the hay. Always keep as close as possible to the scythe. If you have a small force, so much the more necessary that your work should be kept where you can control it. Last summer, I saw a poor man, who had only a few acres to cut, mow it all himself without stopping to attend to securing it; consequently, it was first sunburned until it was worthless, and then exposed to a fourteen days rain. The condition of cattle fed upon such hay may be easily imagined. In these days of horse power, the mowing is the least part of haying; every farmer knows it is more difficult to keep up with the scythe than to do the mowing. Very little is gained by cutting a large quantity at once. Let the sun shine upon it no longer than is sufficient to secure it, so that it may be put into the mow or stalk and not spoil; after this, every hour's sun injures it.

The practice so highly recommended by some of curing clover by raking and cocking it up while green, and after awhile turning it out, and then again re-raking and cocking, letting it go through a "sweat," as it is called, and so fussing with it for several days, is not only bad for the quality of the hay, but, in these days of high wages and scarcity of workmen, very expensive. All the time it is going through the sweating process it is preparing to spoil; fermentation commences, fungus growth is promoted, and though this may be stopped by drying, some parts will have proceeded so far towards decay as to give a bad appearance and flavor, and, with the best of care, will be more or less dark colored and musty. Besides, what is the use of so much work, when the object may be so much better attained with less time? If the clover is cut when it is not damp from either rain or dew, it may be stacked much greener than is generally supposed. Mow on a dry day, let it lie in the swath that day, turn it out the next, (if the crop is heavy, it may be necessary to turn it twice,) put it into cocks and secure it as soon as possible. Do not suppose that when hay is cocked

it is secure; this is a great mistake, for if the weather is fine a large portion is sunburned, and if a heavy rain comes on it will penetrate to the bottom, no matter how nicely it is put up. Cure your hay as quickly as possible, and then put it into the barn. I do not say put it into the stack, because a stack should never be made, if by any means it can be avoided. The amount of hay wasted in stacks would soon pay for some sort of shelter. Let any one move a stack of hay which has stood through half of the winter, and he will be convinced of this fact. A slight shed built on poles will not only prevent the loss incident to stacking under the most favorable circumstances, but also that which very frequently occurs when a stack half built is caught in a rain storm. The fact is, we do not estimate highly enough the difference between hay which is cured so that it comes from the mow with a fine green color and a fragrant odor, and that black, dusty stuff which we too often see thrown out to cattle, and which they can be induced to eat solely by the pressure of famine. If your hay does get wet, or it is necessary to put it up green, do not try to sweeten it by putting salt on it; because salt will cure beef and pork, it is no sign that it will cure hay. The two processes are quite different. Before resorting to the use of salt on hay, would it not be well to ask what is it done for? Is it for the purpose of drying it and stopping the mould? This cannot be, for salt contains a large amount of water of crystalization, and absorbs water sufficiently to become dissolved, and is then a liquid, which does not in the least tend to preserve the hay from moulding. If the salt is used to induce animals to eat bad hay, the effect is produced at an expense more than counterbalancing the worth of the hay; it is much better to throw it away than to allow the stock to eat it. Whatever benefit salt may be when fed to stock in small quantities (and the benefit of feeding salt at all is questionable), salt hay is very injurious. Herbivorous animals were never made to eat their food salted; it is unnatural. Having seen the bad effects of salt hay, I must protest against it, until some one can show, by direct experiment, that it is beneficial.

With prudent foresight and proper management, very little hay need be spoiled, especially if there is some covering to protect it from the weather after it is cured.

THE RAISING OF POULTRY.

BY MRS. R. E. SMITH, ST. LOUIS COUNTY.

I do not propose, in this essay, to put forth any scientific or model theories of poultry raising. Neither shall I sound the praises of any

new importation of fancy fowls. I will merely give the society the results of five years' experience, by one, previous to that time, entirely ignorant of rural affairs. I commenced with about half a dozen common, ill-favored, parti-colored specimens, whose small, white eggs were to me treasures, indeed; gathered almost as soon as laid, and carefully hoarded for future puddings, buttercakes and others of that ilk, well known to thrifty housewives. But six was too small a number, and so, in my daily perigrinations to the market, I curiously and persistently scanned the inside of those pestiferous cages whence city people draw their fowl supplies, and, in good time, obtained about as many more, taking care to select short, yellow legs, thick, heavy bodies, large, red combs, and either white or buff colors. From these I now have a flock with all the said characteristics, well developed, large, buff-colored eggs, and plenty of them, and chickens fit for Western tables, where fried chicken is a luxury, at two months old. They are tame, quiet, easily fattened, and so orderly in their habits as to form a source of great pleasure to one who loves the animal creation, and delights in seeing how beautifully the Creator has fitted each to its proper place, and provided it with instincts of self-preservation and reproduction.

And now as to means and appliances.

Hen House. I have had one which merely shed rain, with some old boxes and barrels for nests, and a few perches in one corner. Here they have laid, hatched and cackled, summer and winter, with the exception of the molting season, uninterruptedly. During the past summer, however, I have added a *sitting* house (shade of John Randolph, forgive me!) rather smaller than the main one, and furnished it with a shelf about three feet from the floor, supporting a row of box nests, with two divisions, one of which is in the former, the other in the latter house. When a hen in the main building has laid all her eggs, and manifests a disposition to sit, I fill the opposite nest with eggs, whirl her around, and there she remains, in the dim twilight, unmolested, cool and quiet. In the corner is a box of ashes, a dish of pure water, and another of food, both of which are renewed every morning during the time of incubation. On the floor of both houses, summer and winter, is a layer of fresh earth, renewed as often as the place needs cleansing. This I have found a most complete deodoriser, and one of my main reliances for the health of my fowls. Quite lately, I have seen this recommended in agricultural journals, but I have done it for four years, and thereby collected a nice compost for the vegetable and flower garden, as well as secured the denizens of the hen house from disease, which is sure to arise from their being allowed to breathe the air impregnated with the ammonia from their droppings. About twice a year, in the spring and fall, the houses and all belonging to them are whitewashed and thoroughly fumigated with tobacco, sulphur and grease, put into an iron vessel, together with some material like taglocks, old woolen rags, or anything that will make an ill-

smelling smudge; the more offensive, the better. Two winters ago I battened and caulked my hen house, and on that fearful New Year's morning, long to be remembered in this latitude, I had fresh eggs, though cracked with the intense cold. Warmth, light and air are three indispensible requisites, if you wish for eggs in winter, but then you need not expect the same hens to lay early in the spring; you must have either a younger or an older brood to do that for you; commonly, a younger.

Food. The best winter feed for full grown fowls I have found to be boiled potatoes, mixed with wheat bran, and the slops from the house; fed lukewarm, and rather wet than otherwise. Add, while cooking the potatoes, (the bran is mixed in a raw state) a generous seasoning of red or black pepper—the former is the better—and if boiled in clear water, instead of slop, a little salt, and, once in a while, a little chopped meat, the entrails of animals or any offal you can get a hold of. This, with pure water every day—a *sine qua non*—and sometimes a little corn, oats or any grain you choose, will keep your hens laying all winter. And here I would say to farmers' wives, who boil bacon so often, in this land of pork and corn, never throw away your potato peelings, your apple cores, your outside cabbage leaves, but save them all, and boil in your pot liquor, taking care that it be not too salt, and your fowls will sing and chatter over the trough, as if thanking you for the delicious dish. But whatever you feed with, do it regularly, and so arrange it that there shall be none left. Hens like cleanliness as well as a Holland *frau*, and will sicken and die on impure water and filthy quarters.

Vermin. Our cross breeds from Asiatic races are much more subject to these pests than the common dung-hill fowl, as they have twice the quantity of feathers, and are more than twice as lazy about performing their toilets. The little red fellows, scracely to be seen by the naked eye, are sure to be the death of them, if not routed in good time. This is only to be done by catching each individual afflicted and administering a good lathering of pot grease, or other, mixed with sulphur, and thoroughly rubbed in on the skin, after which you may roll him in ashes or sand if the case is a bad one. Grease the roosts and nests with coal oil, and cleanse and fumigate, and you will be done for that time. It is better, however, not to let it go so far as this, but sometimes the utmost care will not prevent lousy hens. Any kind of sickness among them will breed the pest, and then a thorough greasing and cleansing will alone save your flock. In this connection, let me call your attention to a statement often met with in agricultural papers just now, viz: that kerosene rubbed upon the fowls themselves will kill vermin. And so it will, and the patient also, if it touches the skin, as I have good reason to know by sad experience.

Diseases. My chickens and their progenitors never have the gaps, so I can prescribe no remedy, but I think the reason is that neither

old nor young are ever let out to range before the dew is off in the morning, and both are well peppered once or twice a week.

As to roup, warmth and washing the eyes with greasy water and pouring down warm melted grease and red pepper, will generally cure them, if not too far gone. It is highly contagious, too, and great care must be taken that the infected individual is not suffered to drink out of the same dish with the rest, as the fetid mucus discharged from the bill and eyes is sure to spread the disease in that way. You can detect the malady by the following signs: the fowl walks about in a slow, careful and timid way, avoiding the others as they rush hither and thither to pick up their food, as if fearful of getting hurt. She will not eat, or even attempt to pick up the most tempting morsel, but stands at the water trough, if not too crowded, constantly sipping until driven away. When caught, you will find the eyes swollen, with a discharge of almost hot mucus from the nostrils. The patient must be stuffed with food, in addition to the medicine of pepper and grease, for a day or two, or until strength returns, for she will not eat voluntarily, seeming to be too weak. A warm corner in a box or basket is a prerequisite, without which all the rest of the care is in vain.

Cholera I think most incurable, unless prevention may be termed a cure, and that may be found in red pepper, clean, warm quarters and wholesome food. What I mean by wholesome food is corn, potatoes and bran, as before mentioned, or anything which, while sufficiently nourishing, contains also what Western people call "roughness"—I know of no better term. Highly concentrated food of any kind is not good for fowls, and if long continued, will produce this disease. A sudden change of habits, food or temperature will also induce it. To illustrate: One summer my better half, getting out of patience with the *fowl* depredations of my pets, decreed them to imprisonment until the oats were cut, after which time they were let into the field. Thinking they would find enough to eat there, and glad to see them once more running about and singing, I gave them entire freedom and stopped feeding them. In a few days they began to die, and in a few weeks I lost sixty out of a hundred. I shut them up again, dosed them with red pepper, allowed them only a few hours' range each day, fed them well, and the mortality began to decrease. By the by, the pepper was administered in this wise: I had tried almost as many remedies as I possessed hens, and all to no purpose, when one day I was making pepper pickles. To do this, the seeds must be removed from the green peppers. These I accidently threw into the hen trough, and a few hours afterwards not a seed or a speck of core could be found, and from that day I lost but one. I took the hint, and now raise peppers for my cackling and crowing friends. Cholera is contagious, too, among hens, if not among hens' owners, as the doctors have lately decided; at least, such has been my experience. I think so because whenever I have immediately removed a fowl thus affected from contact with the rest, the disease has not spread, that is, in sporadic cases,

where no great change of habits has been made, and where the malady has been brought from some other flock, as I have had it done in several instances.

On another occasion, I had no time to attend to the hen house, and being afraid that the fowls would get vermin, I shut them out, as it was quite warm weather. That very night there was a pouring rain storm, which continued until morning, growing very cold towards daylight. In a few days cholera took my finest cocks, in spite of all my doctoring and care, and many of my finest hens, too, so that I learned a lesson not to be forgotten. I might better have risked the lice, for a little grease would have set them all at rest.

There is another fact in this connection, which I should like to state, in order that some one interested in poultry may take notes, and, if possible, come to some conclusion about the matter. It is only by comparing experiences that we can get an insight into some of these mysteries of nature. I once exchanged eggs with a neighbor who had uncommonly large and fine fowls. These eggs were hatched under one of my own hens, at that time entirely free from disease. When about three weeks old, they began to die of cholera, and after having lost all her brood but three, the mother died also. In another week the remainder were dead, but I had kept them in a coop entirely separate from the rest of the birds, and I lost no more. I afterwards found that my neighbor's fowls had been decimated by the disease previous to my exchanging eggs with her. Query: Were the eggs sick? These are all the diseases which my hen-flesh has been heir to; but I will make one remark in concluding this branch of the subject, which is, if a fowl is sick, ten to one lice are the exciting cause.

BREEDING. I have always endeavored to improve my stock simply by retaining the finest specimens of cocks and hens, and sacrificing the rest to the manes of Apicius. In the males, I look for short, thick, golden colored legs, large, erect combs, and long, broad wattles; heavy bodies, broad breasts, and with no great expanse of tail, which should be erect, and better without sickle feathers than with. Double combs I have always found a sign of tenderness and inability to endure cold weather or hardships of any kind. If I wish for large young chickens, early ready for the table, I select a cock with feathers on his legs and feet down to the last of his toes. If I am willing to wait a little longer for just as large a fowl, and one much handsomer, I eschew the mercury appendages. In the female I look for the same characteristics, only I object to tails of any length, and prefer as little of the continuations as may be. I like to see a large pendant comb and a bright eye.

With regard to heads, I have two sorts; one large and full feathered, the other small, with few and short feathers and well set up on a long, graceful neck. These latter are never as large as the former, but they are better sisters, better mothers and more hardy. If I can, I set the latter upon the eggs of the former, and thus equalize the matter to

some extent. I allow one male to five females, and contrive to have these characteristics pretty well divided. When two years old the males invariably go to the table, and the females at three. The latter lay more eggs in the first two years of their lives, but they make better mothers in the last two. My colors are white, edged with straw color, a dark and a light buff and a mixture of black and white or gray, producing a black edged ruff about the neck; but these last, or indeed those having any mixture of colors, are not so hardy as the others, though very large, quiet and tame. I once had three cocks hatched in the spring and killed at Christmas which weighed altogether, when dressed, eighteen pounds and a half, and this without any extra fattening, they having been fed with the rest. So long, however, as poultry is not sold by the pound, as it is not in St. Louis markets, there is not much inducement to raise very large fowls. In cold weather I give twelve or thirteen eggs to a hen, putting a layer of fresh wood ashes, two inches thick, in the bottom of the box, upon which I make the nest of straw or hay. In warm weather I put sixteen or eighteen under one hen, and have found dry leaves a very good covering for the ashes. They do not seem to harbor vermin so much as the hay. If a hen becomes lousy on the nest, which may be known by her staying a long time off when she goes out to feed, with an evident unwillingness to return, standing up over the eggs, etc., sift some sulphur over her and among the eggs, and be sure she has fresh ashes in the hatching house; add, also, a little sulphur to her feed, and some minced meat, if she is confined to the house, and the vermin will disappear. On no account, however, grease anything belonging to her then, for a greased egg will never hatch. It is best, also, to contrive some easy way, some inclined plane or ladder, by means of which these heavy fowls may reach their nests, else they will break the eggs, and an egg, smeared with the contents of another, is also dead to all intents and purposes. As a general rule, never disturb a hen while she is incubating or hatching; but sometimes, if a nest is very full, it will do to pick out the empty shells, if you do not irritate the hen in so doing and make her flutter about. Commonly these large fowls, if well treated, will allow you to pass the open palm next to the breast, carefully down to the tail, and by this means you can remove the shells without difficulty. The reason for so doing is that they often cut the little birds, and they also get entangled in them and are thus suffocated. As to food, I have found nothing better, on the whole, than coarse corn meal, mixed with cold water, fresh every time you feed, not allowed to become sour, with a little pepper in wet weather. It is not cold which hurts fowls, young or old, but dampness. They will not fatten or lay in the cold, to be sure, but they will live and be healthy, whereas wet quarters will shorten their days and curtail your profits.

Little chickens, and big ones, too, for that matter, are very fond of clabber, and it is very healthy food for them.

To conclude, my opinion is that any one may have fine fowls by carefully selecting and breeding from those now acclimated, with less trouble, less danger from disease and with a certainty of profit, not derivable from imported fancy stock. We owe much to those who have already taken the pains to introduce new and finer breeds, and now we may, as in many other like cases in human affairs, reap the harvest which others have sown.

REPORT OF A RECONNOISSANCE

ALONG THE LINE OF THE WESTERN BRANCH OF THE NORTH MISSOURI RAILROAD, FROM MOBERLY TO LEAVENWORTH.

While making this examination our attention has been directed especially to the soils, mineral resources, timber, water, and, in short, to everything that would indicate the capacity of the country to sustain a prosperous people and support a railroad.

TOPOGRAPHY. The country from Moberly, on the North Missouri Railroad, to Leavenworth, in Kansas, is divided between undulating uplands and level river bottoms. These river bottoms extend all the way from the east fork of the Chariton (about eight miles from Moberly) to Leavenworth, save a few short distances where the highlands come to the Missouri river. They also extend high up the streams which flow across this line into the Missouri. They vary in width from a few yards to six and seven miles. The remainder of the country between the Missouri river and the Hannibal and St. Joseph Railroad is moderately elevated uplands, rising from the bottoms by gentle slopes, which are sometimes broken by low escarpments and bluffs.

TIMBER AND PRAIRIE. This whole region is so happily divided with timber and prairie that nearly every farm may have any desirable quantity of each. There is an abundance of good timber for all domestic, farming and building purposes, within easy distance of any part of the country. Timber suitable for ties and other railroad uses can be obtained all along the line of the road.

We observed the following trees and shrubs on the line of this road:

White chesnut, white rock chesnut, chesnut, laurel, black, scarlet, red, pin, Spanish, post, burr and swamp white oak, sugar and white maple, mulberry, common and black alder, crab apple, blur, white and prickly ash, linden, red birch, bladder hut, buckeye, box elder, sycamore, burning bush, red cedar, wild cherry, coffee tree, cottonwood, dogwood, (several species) white and red elm, hackberry, (two species) common shellbark, thick shellbark and pignut hickory, hornbeam, redbud, honey and black locust, pawpaw and persimmons, red and

black haws, black and white walnut, willow, (several species) sassafras and sumach, summer, river and winter grapes, trumpet and Virginia creepers, prairie rose and spireas.

Besides the old forests, young timber has sprung up over large areas, since the settlements stopped the prairie fires, and some of the oak is large enough for rails and railroad ties. As shown by the above catalogue of trees, there is a good supply of the very best of lumber for the manufacture of wagons, carriages and all sorts of agricultural implements and machinery. There is also an abundance of walnut, cherry, locust, maple, oak and buttonwood for furniture of the most common and approved styles.

WATER. But few portions of country are better watered than that through which this road will pass. A glance at the map will show how it is intersected by numerous rivers and smaller streams, many of which furnish good water power for mills and factories. Besides these streams, nearly every section on the upland has a good spring, and in the bottoms good water can always be obtained at a depth varying from fifteen to twenty-five feet.

SOIL. The counties, Platte, Clay, Carroll, Ray, Chariton, and a part of Randolph, through which your road will pass, are covered by varieties of soils, unsurpassed in fertility by those of any equal area in the country.

The soil on the bottoms, like nearly all the bottom soils of the great Mississippi valley, is light, porous, and rich in all the ingredients and properties which make a soil productive and durable. The wide area of bottom lands, both prairie and timber, which lie along the Missouri and extend far up the Chariton and its other tributaries, is not exceeded in beauty or fertility. The forests of gigantic growth, and the wild prairies waving with native grasses, often so tall and dense as to conceal the grazing herds, intersected here and there with fields of luxuriant hemp, and corn, and wheat, tobacco, give abundant evidence of the wonderful fertility of these bottom lands, and the larger portion of them are above the highest floods. The highest of these bottom lands are slightly rolling, and the soil is sufficiently porous to suffer the waters of the heavy rains to percolate through and the moisture below to rise by capillary attraction and keep it moist during the severest drouths of our climate. These properties enable the farmer to cultivate earlier in the season, and sooner after rains than on more clayey soils. And it is a well known fact, that when the crops fail elsewhere, either from an excess or scarcity of rain, a supply can always be obtained from the bottom farms. These lands in the prairies of the beautiful Bowling Green and the magnificent Wyaconda, never fail to meet the highest expectations of the faithful husbandman. The soil on the uplands is based upon the rich silicious marls of the bluffy formation, which, mixed with the decayed vegetable and animal matter, and the ashes of the annual fires of the past unnumbered ages, have made a soil at once rich and well nigh inexhaustible, for,

when the surface soil shall have been exhausted by long cultivation, deep plowing will restore it to its primitive productiveness, by mingling the marly sub-soil with the surface material. The experience of the farmers in this region fully sustains what these facts would lead us to expect, from the productive energies of these soils. Though the country is new and the modes of cultivation in general use none of the best, yet the crops produced will compare favorably with the most productive regions in the Mississippi Valley. A small portion of the upland between the forks of the Chariton and along some of its small tributaries is broken up into white oak ridges. These ridges, though less productive when cultivated in the staple crops, are very valuable for their excellent timber and their wonderful adaptation to the cultivation of fruit and the better qualities of tobacco.

CROPS. All the staple crops of the Middle States do well here. Corn, wheat, rye, oats, buckwheat, sweet and Irish potatoes, and all the garden vegetables grow in the greatest perfection, even with the poor cultivation usually bestowed upon them.

The farmers of this region inform me that these lands yield, with ordinary culture only, as follows:

Tobacco, one thousand five hundred to one thousand eight hundred pounds per acre.

Hemp, one thousand to one thousand five hundred pounds per acre.

Corn, fifteen to twenty barrels per acre.

Wheat, twenty to twenty-five bushels per acre.

When extra cultivation is applied crops far greater than these figures indicate are produced. With such a soil over the two million acres which will be tributary to this road, we must expect a thriving population, with vast surplus products for such markets as St. Louis and Leavenworth, which your road will open to this favored region.

FRUIT. This is one of the best fruit countries in the West. Apples, pears, peaches, plums, cherries and all the small fruits come to great perfection in these counties. Grapes also do as well here as on the Lower Missouri or the Ohio. The soil of the highlands is admirably adapted to their culture.

GEOLOGICAL FORMATIONS. The rock formations beneath the soil are of the highest importance in determining the adaptation of a country to the construction and support of a railroad. The soil and the strata of sands, marls, humus and clays which underlie the soil in the level bottoms are of such a character that the road bed can be constructed at a very little expense, and the silicious marl beds of the bluff formation, on the high lands, are so thick that very few of the cuts will reach the consolidated rocks beneath it. This fact, even in the more extensive portions of the route, will render the cost of construction comparatively small. And, besides, the beds of limestone, which crop out in nearly all the escarpments and bluffs of the streams throughout the extent of the route, will be most useful in constructing the culverts and bridges.

But the extensive beds of coal, hydraulic limestone, iron ore and clays suitable for both common and fire bricks, will prove of the highest importance in running the road and furnishing it with profitable business. The coal measures, which contain these beds of coal, hydraulic lime, iron ore and clays, underlie the whole of the highland country between Moberly and Leavenworth, and there is little doubt that a large part of the bottom lands are also underlaid by the same formation.

This is most certain to prove true of the bottoms on the western end of the line.

Coal. There are at least four, and probably six, successive beds of good workable coal extending nearly all the way from the North Missouri road to Weston. They vary in thickness from one and a half to six feet. Some one or more of these beds crop out in the bluffs in nearly every stream from Allen to Richmond. Beyond Richmond, to the west, the rocks which contain these beds of coal dip beneath the surface, and, as a matter of course, carry the coal with them. These rocks continue westward beneath and beyond the Missouri river, and there is scarcely a doubt that the coal beds continue with them in their westward extension. It is known that one of them, the Lexington bed, which dips beneath the surface near Richmond, does extend as far as Leavenworth, where it was found by boring, in its proper place in the rocks, two hundred and twelve feet beneath the surface. And the other lower and thicker beds are quite as certain to continue westward as the Lexington bed.

Between your road and the east fork of the Chariton, there are at least three beds, ranging in thickness from one and a half to four feet. Two of these beds crop out on the Moniteau; and on Silver creek I found the following section from the top downward:

No. 1, two feet, hydraulic limestone.
No. 2, nine feet, shales.
No. 3, four feet, hard blue limestone.
No. 4, three feet, blue shale.
No. 5, one foot, black slate.
No. 6, eight inches, coal.
No. 7, six feet, marl and clay.
No. 8, one foot, sandy hydraulic limestone.
No. 9, thirty feet, sandy shale and fire clay.
No. 10, one foot, black shale.
No. 11, four feet, good bituminous coal.
No. 12, four feet, fire clay and marlite.
No. 13, four feet, limestone.
No. 14, three feet, fire clay.
No. 15, one and one-half feet, good coal. This coal is in the bed of the creek.

At Switzer's Mill we found limestone, fire clays, and a bed of good coal, eighteen inches thick. At Huntsville a bed of excellent coal,

four feet thick, crops out on both sides of the town, and has just been opened by Messrs. Chapman & Burke, a few feet beneath the bed of the road. All of these beds dip beneath the higher ground to the east, and, probably, extend as far east as your main line.

Between the forks of the Chariton, and along their bluffs, several beds of coal make their appearance. There are three beds, one four feet thick, near Salisbury, and one at Williams' Mill. Between the Chariton and Grand rivers, these coal beds make their appearance in numerous places in the bluffs of the Missouri and Grand rivers, and in the high prairies to the north.

On Brush creek, at Kirkam's coal bed, we found the following section of rocks:

No. 1, twenty-five feet slope from top of ridge, covered with fragments of sandstones and clays.

No. 2, one foot, blue shale.

No. 3, one and one-half feet, impure coal.

No. 4, four feet, brown shale.

No. 5, one and one-half feet, hydraulic limestone.

No. 6, four and one-half feet, blue shale or fire clay.

No. 7, one and one-half feet, black shale.

No. 8, eight feet, fire clay, with concretions containing sulphuret of zinc.

No. 9, eighteen inches, good coal.

No. 10, one foot, good fire clay.

No. 11, sixteen feet, slope covered with the fragments of the rocks above.

No. 12, eighteen inches, carbonate of iron, an excellent ore, apparently in large quantities.

From the Grand river westward to Richmond good coal beds lie near the surface all the way, and crop out in numerous places in the bluffs of the streams and escarpments of the ridges and ravines.

A little northeast of Richmond, on Rock creek, I found the following section:

No. 1, four feet, hard blue limestone, in irregular beds.

No. 2, one and one-half feet, bituminous shale.

No. 3, twenty-two inches, excellent coal, same as the Lexington road.

No. 4, two feet, bituminous and fire clay.

No. 5, two and one-half feet, hard bluish gray hydraulic limestone. Only a part of this bed is exposed at this locality; at other places it is five feet thick.

No. 3 of the above section is the highest workable bed of coal in this region; the lower beds, exposed to the east, have all gone beneath with the rise of the country. One of those beds, four to six feet thick, was passed through two hundred and fifty feet below the surface, seven miles from Richmond, on Crooked creek.

I am indebted to H. H. Beeson, Esq., for the record of the borings in this well, under his supervision.

The finding of this bed so far from where it dips beneath the surface, is an additional evidence that the lower beds continue westward to Leavenworth, as well as the Lexington bed, as proved by the borings at the former place mentioned above.

It is proved that one of these good coal beds continue, westward from Richmond to the western terminus of your road, at least, and there can be but little doubt that the lower and thicker beds do the same. If so, these beds between Richmond and Weston will range from fifty feet to six hundred feet beneath the surface, varying in depth as the country rises and falls.

The depth of these beds can be no serious difficulty in working them with profit, where large quantities are raised, as the extra expense of raising coal the distance mentioned above will not increase the cost more than one cent per bushel.

These facts prove, beyond all doubt, the exitsence of inexhaustible quantities of good coal all along the line of the proposed road. The four feet bed alone, which we know extends from near the eastern terminus to Richmond, will yield more coal of a good quality than the road can transport for many years. This bed will yield four million tons per square mile, or twelve billion tons from the country ten miles wide on each side of the road. Should this bed underlie only one-half of this area, deducting one-half for the low ground and places where it possibly runs out, you will have from this bed alone six billion tons; as much, surely, as one road can transport while the present directory need provide for its success. It will give the road ten million tons per annum, or over thirty thousand tons per day, for six hundred years; but it should be remembered this bed contains only a small part of the coal on the line of this road.

When the road is located, and the grade determined, it will require but little examination to determine the depth of each of these beds below the grade, at the various points where it is desirable to obtain the coal.

Building Stone. Good limestone and sandstone come to the surface on the streams and in the ravines all along the line of this road.

Many of these rocks are very durable and well adapted to use in bridges, culverts and buildings; but those of superior qualities for these purposes are most abundant towards the western terminus.

Hydraulic Lime. There are good hydraulic limestones at several localities on this road, as shown in the sections given above.

Fire Clay. Fire clay was also found at Leavenworth, Richmond, Carrollton, on Grand river, and in several places on the Chariton and and its tributaries.

Iron Ore. Beds of carbonate of iron were observed at several localities, but the most important was that at Kirkam's coal bed, near the mouth of Grand river. This bed is eighteen inches thick and of

good quality. Its extent could not be determined, as the rocks which contain it are exposed for a short distance only; but its geological position in the coal measure indicates a wide range. It would probably furnish ore sufficient to justify the erection of a furnace, should circumstances render it desirable. The abundance of good coal at this locality is an important item in determining the value of iron works at this point.

SALT SPRINGS exist on the east fork of the Chariton, within a few yards of the proposed line of the road, and also on Grand river, and north of the road in Ray county. The brine is strong and pure and abundant. Salt was once successfully manufactured at the first locality named above.

MINERAL PAINT. There is a large bed of good mineral paint, of a good color, extending from Richmond to Weston. It has been used for fourteen years, and proved both ornamental and durable, and a good protection against fire. It is destined to become an article of great commercial value.

TOWNS AND POPULATION. Weston, Liberty, Richmond, Carrollton, Brunswick, Keytesville, Huntsville and Salisbury are flourishing and growing towns on the proposed route. Each of these places is the commercial and educational center of a rich agricultural region, and will yield a large amount of business to a road passing through them on the nearest route from the great commercial emporium of the Mississippi Valley to Leavenworth, the great business mart on the Missouri.

Such are some of the facts which show most conclusively that this road will pass through one of the richest agricultural and mineral regions, already occupied by an energetic and prosperous people, whose towns are fast filling up with business men and capital, and whose broad acres are being broken by a rapidly increasing number of hardy and forehanded yeomen.

THE STUDY OF NATURAL HISTORY.

BY DR. GEORGE VASEY, RINGWOOD, ILLINOIS.

Natural history embraces the history of physical nature, as displayed in the mineral, vegetable and animal kingdoms.

Those branches of knowledge which have for their purpose the study and classification of the various objects of nature, are called the natural sciences. They are, in fact, the studies which engage the earliest attention of the human mind. An acquaintance with the various objects by which he is surrounded, is the first labor and the earliest

pleasure of the child. No doubt, emotions of wonder and surprise are felt as, day by day, he extends his acquaintance with the objects around him. As years progress, and his means of observation are extended, he finds new subjects of inquiry, new scenery, new animals; new flowers and plants attract his attention and excite his admiration and delight.

Alas, that by constant familiarity with the objects of nature, we should cease to regard them with those emotions with which they constantly impress the childish heart! He who can live to mature years among the busy cares and pursuits of human life, and find his heart still capable of those emotions of admiration and delight, with the additional feelings of veneration and love for the great Unseen, is indeed a naturalist of the right kind.

May it not be one of the greatest acts of homage which we can render to the Creator to appreciate the wisdom, power and goodness displayed in His works? How full of veneration and worship is that language of the Psalmist, "the heavens declare the glory of God, and the firmament showeth His handiwork."

The study of the natural sciences should occupy a prominent place in the education of youth. It may be contended that they are of no practical value, and that they do not fit for the active business of life. But man was never designed to be wholly a creature of business. The purpose of his creation is not answered if he pass away his life as a mere animal. To eat, drink and work, is not the whole duty of man. Says Linnæus, "that existence is surely contemptible which regards only the gratification of instinctive wants, and the preservation of a body made to perish."

The mind demands employment and development. It is constituted to observe, to analyze, to compare, to reason; and wide scope for the exercise of these powers is presented in nature. So far as our circumstances will admit, we should study her in all her forms and appearances. We may go with the geologist into the depths of the earth, and there read the history of ages long past and forgotten; we may, with the zoologist, inquire into the constitution of the animal creation; with the ornithologist, we may acquaint ourselves with the different species of the feathered tribes, with all their peculiarities of song, plumage, migration and habits; with the entomologist, we may collect together the almost numberless species of the insect race, learn their habits, their instinctive skill, and their mysterious metamorphoses; and, with the botanist, we may investigate the variety and beauty displayed in the vegetable kingdom. Thus may we, with the greatest benefit, "look nature through" and observe her mystic appearances and developments. The influence of these studies in forming habits of observation is very valuable. The naturalist will be constantly required to exercise his powers of discrimination, to bring together things that are related and to know in what these relations consist. By such frequent exercise he will acquire expertness

and accuracy of judgment, which he will naturally transfer to other subjects which may engage his attention.

The study of nature is also a source of the purest pleasure, and of the most refined and innocent enjoyment. To the naturalist every object is full of interest; give him the broad field of nature, and he is never alone. Everywhere around him a thousand forms of life meet his eye, a thousand melodious voices break upon his ear, a thousand living tongues speak silently but effectually to his heart. He holds converse with flowers, "finds books in trees, sermons in stones, tongues in the babbling brook, and good in everything."

We will now endeavor to show that the natural sciences have a strong practical bearing upon the pursuits of life, and especially upon the agricultural interests of the country.

We may well be proud of the triumph which man has achieved over all the larger and nobler forms of the brute creation, but there are indications that the scene of war must soon be changed, and that the ever active human mind must hereafter be directed to the conquest of the lower orders of living beings.

It is becoming of great importance to the agricultural interests of the community that the insects which are injurious to vegetation should be well known, so that some means may be devised for counteracting their extensive ravages. Millions of dollars are annually lost by the depredations of the weevil, the fly, the chinch bug, the curculio, and the potato insect; and until these insects are better known and their habits more thoroughly understood, our crops must continue to be at their mercy.

Mr. Thomas, an entomologist of Southern Illinois, alludes to this subject in the following words:

"The luscious fruit is withered by the curculio. The golden fruit is cut down in its prime by the chinch bug, weevil and rust. The young maize is swept away by the army worm. The little bruchus renders worthless the ripening peas. The cucumber dwindles away before the galeruca. The cabbage plants and turnips are riddled by the hattica. Wherever we turn our insect enemies are present, ready to meet us, while at the same time our friends are by our side, but we are unable to recognize them, and thus we often wage war with those who are destroying our worst enemies."

This last remark is true not only with respect to insects, many species of which are the natural enemies of others, but it is also true in respect to the indiscriminate and wanton destruction of birds, by which our friends and enemies are slaughtered together.

There is a great deal of popular ignorance respecting the vegetable productions by which we are surrounded. Very few persons are familiar with the names and peculiarities of one-half our forest trees and shrubs. Probably not one in a hundred have any conception of the great number of species of plants which might be found in their own neighborhood. Many farmers, even if interrogated as to how

many kinds of grasses grow on their land, would probably answer, timothy, June grass, redtop, blue grass, *clover* and wild grass; thus counting among the grasses a plant as different in structure as the bean or the locust tree, and placing under the one name of wild grass perhaps forty or fifty totally different species. Many persons are not aware that the cereal grains, which furnish the principal part of the food of the human family, together with the sugar cane, maize and broom corn, are true and proper grasses, while buckwheat, though it abounds with farina and forms an important article of production for food, belongs to a widely different family.

These facts, to be appreciated, require an intimate acquaintance with the structure of plants, which forms a part of the science of botany. For the want of precise botanical information, a great deal of confusion exists as to the names and identification of many medical plants, and it frequently happens that the same plant is called by different names, and plants totally distinct in their nature are called by one name. It is often highly important to be able to recognize medicinal plants and to distinguish those which are poisonous. For the want of proper knowledge on this subject, we every year hear of persons being poisoned by the use of plants and roots, of whose qualities they were ignorant.

Thus we have glanced at a few of the many interesting points connected with this subject. The field for inquiry is extensive and inviting. Many of our young people plead want of time, but it is lamentably true that many of them waste more years in useless and frivolous amusements, and in the indulgence of penicious habits, than would suffice to gain them the reputation of scholars, if properly employed. All that is needed is a persistent and persevering employment of those scraps of time which are usually wasted or misemployed.

May we not hope that many young persons may be led to seek, in the study of nature, for higher and more ennobling pleasures than can be found in reckless endeavors to kill time or secure mere animal gratification.

REMARKS ON THE PEAR AND GRAPE.

BY F. A. ELLIOTT, ESQ., OF CLEVELAND.

Dr. L. D. Morse, Corresponding Secretary State Board of Agriculture, St. Louis, Missouri:

DEAR SIR: Your kind request that I should prepare for your State transaction a short paper on pear culture, with, perhaps, something on grapes, came to hand in due course of mail, and I replied, accepting

the task. But I put off the day of labor from time to time, until a sprained arm prevented my doing anything with pen or pencil for a long period, and now I fear the little that I may write will reach you too late to be of avail. I, however, take so strong an interest in fruit growing, that I shall venture to write, and though I do not propose to strike out any decided innovation on the teachings of the books, yet, perhaps, the reader may gain in the way of a hint toward advancement.

From the knowledge I have of Missouri, no State in the Union possesses superior advantages for fruit growing, and especially for pears and grapes; both climate and soil, over a large portion of it, are ready to hand, and the owner has only to plant and reap. Not one farmer in a thousand doubts his ability to grow apples, and if he could once eat a really good pear, and divest himself of an impression that "pears are difficult to grow, and, besides, it takes too many years before they produce," he would plant pear trees nearly, if not quite, as freely as apples. In my experience, I have found standard pear trees, of certain sorts, produce fruit quite as soon as standard apples, and when we take into account the actual superiority of the fruit for eating, and its extra market value, it is wonderful that so few plant pears in any quantity. The objection that many make, of "liability to blight and die," I consider not at all valid, because, in looking over hundreds of acres of territory, and in different States, I find that where there has been one pear tree, nearly or quite one hundred apple trees have been planted to correspond—and I find that every apple orchard has occasionally a tree or two die out of it.

The liability to blight in pear trees, even of all sorts, and with the injudicious care often given them, I consider as only about two per cent. True, an orchard of pears occasionally gets thinned out by blight, but as such orchards are generally made of a great many sorts, and being in the hands of an amateur, have been stimulated by manures, etc., to develop faster, and more than nature designed, they, therefore, have, in a measure, been weakened in their system, and are more readily acted upon by temperature; and, possibly, by the undue softness of the wood, present more tempting attractions to the insect *Scolytus* than trees which have only received ordinary care. I notice, again, that even while blight has thinned out such orchards occasionally, the few trees—one, two or more—in other grounds adjoining are not always affected, but continue to go on healthy and vigorous. Experience has taught pomologists that all apple trees are not alike capable of withstanding the changes of temperature in our Western States, and great care is now taken to select varieties known to endure severe changes of heat and cold. The same knowledge is connected with the pear, but its application is not so correct, nor is it so general. It is not so correct, because but few varieties of the pear comparatively have been grown at the West, and because the pears have generally been manured and petted to their injury, being planted in

some "rich, nice place" around the house or barn, and not cultivated like the apple trees, or no better than a field of corn.

In selecting apple trees, nearly every one regarded as hardy are possessed of a close, firm wood, short jointed, and that in growing make considerable small spray or branches. In selecting pear trees similar characters should guide, and where the trees are possessed of a pretty upright growth, the advantage is in their favor. So far I have written in relation to what are termed standard pear trees, that is, trees budded or grafted on young pear seedlings. I will only add here, because it should always be remembered, that every pear tree should have its lower limbs to start not more than two to three feet from the ground.

Cultivating the pear as a dwarf, however, is now by many regarded as more desirable than to plant the standards. Where a man has but a small extent of ground, or where a variety of sorts is desired, it is doubtless the most satisfactory way; but where one has an abundance of land, and looks forward to profits from a few sorts, standards will return the most corresponding with the outlay of labor.

Dwarf trees require a knowledge of vegetable physiology, and a pretty good knowledge of the habits of varieties, in order to render their culture either profitable or pleasant; but the man possessed of such knowledge, will find no occupation repay him better, both in pocket and mind, than cultivating dwarf pear trees—and yet, even with dwarf pears, the list of profitable sorts embraces but very few; one of the most extensive growers, after a thirty years' experience, during which he has fruited over seven hundred kinds, names only six varieties to plant for profit.

I have said that where a man has but little land, dwarf trees are most desirable. This I must qualify by adding that he who plants dwarf pear trees must know the habits of the tree and how to prune it as a dwarf, or he will have made a mistake in selecting dwarfs rather than standards. He who does not know how to prune had better take two standard trees and plant them where he expected to have placed four dwarfs. The standards require no more care or pruning than apple trees; whereas, if the dwarfs are not carefully and correctly pruned each year, but a few seasons will elapse before they are dead and gone.

As this article is not to be designated as an essay, to display fine writing or too many technical terms, only understood by the initiated, but simply a record of notes from practice, designed to aid by its hints rather than its teachings the young beginner, I must be excused from elucidating every idea by long paragraphs and many words.

Having decided upon what we will plant—whether standard or dwarf—our next item is the selection of varieties; a pretty difficult matter, you say, out of nearly a thousand sorts named and described in the books. To the beginner, this is—especially as he often has only the nurseryman's catalogue as his guide—and that has affixed to each

variety, "excellent," "superior," etc., etc.; but it is as well to see and know the rock on which others have broken down their fruit profits, as to be instructed in what may prove the right course.

Let us then assume, what is the fact, that others well skilled in pear growing, located in good positions, and with soil and all pecuniary means for trying experiments, have tried all these different named varieties, and after so doing have decided that for a selection of six sorts to grow as standards in climates where extremes of temperature are great, with soils naturally so rich as to create too rapid, rather than too slow growth, the following are as good, if not the best fruit of the whole—giving fruit from August to March—viz: Dearborn Seedling, Sekel, Buffam, Flemish Beauty, Lawrence and Winter Nelis. Then, for dwarf, take Bartlett, Urbaniste, Louisa Bonne de Jersey, Beurre d'Anjou, Duchesse d'Angoulême and Vicar of Winkfield.

The selection of varieties having been made, next let us locate and prepare for planting.

As we have before said, Missouri is a climate of extremes of temperature, and so rich are its soils naturally in nearly all the elements requisite to grow trees vigorously, that we must guard against too much, rather than too little growth. Low muck or vegetable loam lands we know give strong, rank growth, and if in valleys, not broad, open prairies, they are liable to frosts late in spring and early in autumn. Hillsides or tops, where the soil is rather poor for general crops, are our best locations; for their poor soils have in them material to grow trees quite rapid enough for their permanent durability.

But perhaps you have no such land or location where you would like to plant; but you desire to place your trees near the house, where they will form shades as well as supply fruit; and the ground around your house is pretty rich. Well, let us plant there, and as the trees, when grown, are designed to be in grass, that is, to have turf all around them, for we are now planting standards, we will spade up the ground a diameter of six feet, in a circle, and just one spade deep. We will then set our tree in this center, on top of this level soil, and going around the outside of our circle, will dig just one spade more, making our circle about seven feet diameter; with this last spit we cover the roots of our tree, and then we take the spade and dig up this last circle one spade deeper, thus breaking into the sub-soil, and, in fact, making a drainage to take away surplus water from the center roots of our tree, while we leave good soil around them. Is not this better than to dig a hole two feet deep, putting in stones at the bottom, and then planting the tree on them? Do we not all know that once the sub-soil is broken then the water settles, and if we dig holes, do we not form imperfect cisterns to hold stagnant water under each tree? and do we not all know that water immediately under the stem of tree or plant is more injurious to it than when it is taken away even a distance of only three feet? I hope all may have their land underdrained; but I know a great many have it yet to do.

We have planted our tree, it is true, because, in selecting the place and digging, it came in the natural course of things to plant; but of course we pruned the end of every root with a sloping cut upward from the under side, in order to have it heal over and form new roots readily, and we cut back the limbs of the tree so that we left not more than three good buds of the last year's growth on each of the strong and healthy limbs, and we cut all the little, puny limbs or twigs entirely away.

If we had done this work for an orchard of fifty or more trees, we should of course have had the plow do our spading; and, after we had finished planting, we would have plowed between each row of trees with a common two horse plow, following it with a sub-soil plow.

So much for our standards—now for the dwarfs; and as these are pears budded on quince roots, we must calculate for a pretty good soil of clay loam, or even strong clay; and we must understand that, unlike the standard or pear root, the dwarf, being on quince, will not do to grow in grass plots, no matter how much you dig and mulch around them; in fact, digging immediately around the body and under the branches of the tree is injurious rather than beneficial. Let us, then, make our plantation where, with horse, plow and cultivator, we can stir the ground between the trees, while keeping the weeds and grass from growing directly around them by means of the hoe. Or if convenient, keep the ground light and loose by mulching—that is, covering the whole of the ground over four inches deep with straw, coarse hay or any similar material. Experience, I think, however, favors working the ground and leaving it exposed for the first three or four years after planting, or until the trees commence bearing freely.

In preparing our ground we will mark out our rows eight feet apart and plow two furrows each way, that is, four furrows, and leaving our center or land furrow. This plowing we do about seven to nine inches deep, and proceed to plant our trees along the furrow every eight feet, and just so deep that when the furrow is turned back all the stock or quince on which the pear is budded will be below the ground. With our trees set, we next turn back the furrows and then add a sub-soil plow to follow our first or common plow, and finish plowing the ground between the rows, just as for standards. But now comes the trouble in growing of dwarf pears, and I might write page after page, and without illustrations the novice would gain little knowledge. I shall not, therefore, attempt it; but advise two things if you are going to grow dwarf pears. The first is, never to trust the miscalled knowledge of the tree dealer or peddler to show you how to prune, for not one of them in a thousand, I think I may safely say, really knows any more about it than you do. An old dwarf pear tree cultivator told me, not long since, that it was rarely he found a man among the many really good gardeners he had employed—men who commanded salaries of six to ten hundred a year—who really could prune a dwarf pear tree two years and not spoil it.

Second. Get the best book or article, illustrated, on pruning dwarf trees, and study it carefully, then go and visit some one who has been growing and fruiting dwarf trees successfully for years; make two visits—one when the trees are being pruned with the knife in the fall, and one in June, when the work is performed with thumb and finger.

One more remark, and I will leave the subject of pears. I have said that the soils of Missouri are rich naturally in nearly all the requisites to grow trees and fruit. This remark may apply to all the West, commencing if you will, as far East as Rochester, New York. Pears are grown as dwarfs by the acre successfully, because profitably, and the fruit is large and handsome, but as a whole, I do not think it equal in appearance or quality to that grown around Boston and other sections on the sea shore. What influence the salt air, frequently in storms or mist, that comes from the ocean, may have, I will not here pretend to say, but after looking at the matter some twenty years, I am satisfied it does have an influence. Nor will I pretend to say how beneficial the use of salt as a manure may be on pear culture, and especially dwarf pear culture at the West. I will only add that I consider it indispensable, and that I use from two to eight bushels per acre, with one bushel of plaster of Paris, (gypsum.)

Bone meal is desirable and valuable, and may be used in quantities to suit—a little will answer the wants of the tree, while a large quantity will not injure. I do not use animal manures, and advise every tree grower in Missouri to place such material on his corn, and not on his fruit grounds.

THE GRAPE. Upon this subject I feel that you have in Missouri those from whom I can learn, as indeed I may say I do daily from all fruit growers; for, looking as I do upon our country in its true state, viz: all new and crude, and viewing the fallacy from year to year of "stereotyped truisms of the books," I find that I have to unlearn almost as fast as I learn; that is, my practice and daily observation comes often in direct clashing with what I have read. More and more is this apparent and direct, when such readings have been of foreign authors. Our climate and soils, our progressive people, and their here to-day and there to-morrow habits, require modes of labor, in fruit culture, as in house building, adapted to them. Trenching grape lands, and pruning at just such a time in February, are no longer acknowledged as indispensable to growing grapes successfully and profitably; and I have strong impressions that a great number of diseases attributed to a variety are more or less caused from man's abuse of the vine, by following some dogmatical course in its cultivation. "What not to do," it is said, and truly, often enables a person to achieve success, as much as to have a routine laid down to follow without the use of the mind bestowed by a good God on man. One of the items "not to do," is the old and long continued imported way of pruning the grape vine, both in winter and in summer. Another, is not to expect every variety

of grape to do equally well on the same soil, in the same location, and under the same course of cutting.

The record of Mr. Husmann, of Hermann, Missouri, one of the most intelligent horticulturists in the United States, that Catawba is unreliable and unworthy further cultivation in his section, may show only that something in the soil is wanting, or in excess; or, it may be that erroneous practices of many who there grew it have induced disease, which spreads and affects all of the variety, some more, some less, as the vines are old or young and correctly or incorrectly managed. I say this record may, perhaps, be thus accounted for, because we have record of the same variety of grape doing finely in another part of the State and of its success in all Northern Ohio; and, therefore, while we acknowledge Mr. Husmann and his judgment for his locality, we cannot discard the variety. Similar items would be applicable to nearly every variety of grape now generally distributed and of bearing age. The Concord, although from its vigorous habit and parentage, seemingly growing well in almost all soils and locations, yet does occasionally get a check mark, as being unworthy. The Delaware is another that often does not require to go out of one field to record its failures and its successes; it growing vigorously and ripening fine fruit in a rich deep soil, and doing worse than nothing in a poor hard clay, where perhaps the Catawba or Concord thrive gloriously. The Cuyahoga and Anna, both most excellent sorts, so rarely ripen in their own sections of nativity, that they are there generally discarded; but, as they do mature most beautiful fruit, say one year in five, it appears rather an evidence of climate in their case than of soil. The true Isabella almost always mildews on the shore of Lake Erie; while a variety of it, and there often grown as Isabella, but which is known as the Aiken, never mildews; showing that one remove, unobserved except by a careful examination, will create a valueless sort into one of great value; for, in the sandy soils east of Cleveland, Ohio, the Catawba does not make a good wine grape, but the Aiken does make a good and profitable table grape. From these, and other similar cases that might be written, it is evident the term "good for general cultivation" cannot be applied to any one grape yet tested. The subject of selection of soils for profitable grape growing is, then, to embrace quite a number of items, viz: 1st, the variety of grape to be grown; 2d, the object, whether wine or the table, or both; 3d, the character and kind of wine; 4th, the location and climate, combined.

Were grape growers in this country willing to abide by old country rule, and obtain a crop of really superior fruit once in about five years, and indifferent fruit the balance of the time, then the Cuyahoga and Anna, already named, would be suited to their native locality, if either fruit for the table, or wine, were the object. But our people are no such class. The order is, plant and gather in; they can hardly wait a year, and certainly do not often let the vine get full strength and maturity before they permit it to ripen all the fruit it can. With this de-

sire for immediate and profitable results before us, we have, as I have said, several points to consider in selection of soils; for we have yet, as a people, to learn really what are the most valuable soils, or rather we have to take a complicated view and consider what soils will grow certain varieties of grapes and give to them elements of value for the table, and in event of some unlooked for season, or disease that unfits them for the table, render them of value for manufacture into wine, so that the grower may find profit rather than loss in his account balance.

The test of instruments giving the weight of must, the various quantities of sugar, alcohol and acid in a given variety, grown on various soils and in different climates, appears the only guide to the grower of grapes for wine; for although glycerine, potato sugar, etc., etc., can be added to bring up the juice to a required standard, if the grapes have character requiring no such addition, then of course they are more valuable than those containing less desirable elements, only to be applied by foreign agents. Again, seasons make great change in climates, and one sort, as instanced in the Anna and Cuyahoga, may occasionally be good in it, but not as a rule. One picking of Catawbas this past fall, about the middle of October, gave only eighty-seven to eighty-eight of must, while another picking from the same vineyard, as late as the 10th of November, gave ninety-four to ninety-six of must. The quantity of acid was also reduced in the last nearly two per cent.

The grower of grapes for the table, has only taste for his guide, and as taste knows no law, he must either select from his own or that of some friend; the Concord by some persons being regarded as delicious, while others are only pleased with the Delaware. If already possessed of land, then knowing his soil, he can cast about an inquiring mind and find that Aiken and Concord do well on sand; that Hartford hangs better when grown in clay than in sand; Delaware requires a rich soil, while calcareous soil gives the best Catawbas. These are some of the general points he will learn, but both the grower for table and for wine, require of pomologists or of States, through pomologists, carefully gathered data and tests through several seasons to enable them to select varieties best adapted to their varied soils and locations. The State Board of Agriculture of Missouri has a great interest to foster in the grape, and they should take some course to assist the new settler or planter to select his varieties of grapes to meet the character of his soil. A small sum paid yearly to careful pomologists in different parts of the country, for time expended in obtaining instrumental tests of the quality of grapes on varied soils—the growing of vine, liability to disease, etc., etc., would be money paid out to come back with forty-fold interest.

Having said so much in relation to soils, I will add only a few words on pruning, and close my notes.

I have said that my impressions were that more or less of the infirmities and diseases of our hardy grapes came from following some dogmatical rules laid down for cultivation. Among these rules, cutting

away of the root is one that admits of question as to its policy; but a greater one is the rule to cut back in pruning to so many buds, without regard to soil or variety of grape. It is like recommending one grape for all soils and situations, and is to be remedied only by knowing what soil is best suited or gives the most vigor of growth in vine to a particular sort, and then adapting the system of cutting to meet the parental vigor and general structure of that soil. This, again, will have to be graduated to meet varied localities or climates; and as each variety of grape differs somewhat in its habits, in its parental vigor and hardihood, as well as in its adaptation to soils, so each variety will require a few words relative to the best manner of pruning, to enable it to endure changes of temperature and loss of matter from year to year in the production of fruit.

That Missouri may strike out a course of culture for grapes, as well as other fruits, worthy of the world to follow, is the wish of

Yours, etc., F. A. ELLIOTT.

FUNGI AND VEGETABLE DISEASE.*

BY W. C. FLAGG.

Fungi, botanically considered, belong to the criptogamous or flowerless series, in contrast to the phænogamous or flowering. These flowerless plants are divided, according to Gray, into the following classes:

1. Acrogenous plants, including the rush, ferns, etc.
2. Anophytes, including mosses, etc.
3. Thallophytes, including the lichens, fungi, seaweeds, etc.

Of this latter class the "Ord. fungi (mushrooms, moulds, etc.,) are parasitic, flowerless plants, either in a strict sense, as living upon and drawing their nourishment from living, though more commonly languishing, plants and animals, or else as appropriating the organized matter of dead and decaying animal and vegetable bodies. Hence, they fulfill an office in the economy of creation analagous to that of the infusory animalcules."

"They occur," says the New American Cyclopædia, article fungi, "in all parts of the globe, finding their maximum in the moist, temperate zones, abounding in a climate like that of Sweden, which has produced more species upon a given area than any other known locality, except, perhaps, the Southern United States. * * *

*An essay read before the Alton Horticultural Society.

Nothing of vegetable origin is free from their ravages, when exposed to influences favorable to their growth."

Though found on many animals, insects and animal matters, "they principally affect decaying vegetation. Their vegetating fibres are of such minuteness that they penetrate the hardest woods, and are thus powerful agents in their decay. Their delicate, evanescent, fragile mycelium fastens upon the falling giants of the forest, and hurries their slow decomposition. They attack the housekeeper's bread, cheese, vinegar, paste, preserves and mustard, the farmer's corn and potatoes, the vintager's grapes, the gardener's berries and the joiner's timber, while a host of forms prey upon the living tissues of plants, scarce any of which are free from their depredations, and many of which are assailed by a dozen different species at once."

"Fungi are of purely cellular growth. They form no woody fibre like flowering plants, nor do they form chlorophyl in their tissues. They consist of mere aggregations of continuous cells. Though many become corky, woody and horny in the course of their growth, they have no other identity with true wood than of density and weight, possessing none of the complex structure of flowering plants. They exhibit a wonderful variety of external forms, but the composition of them all is the same—an aggregation of simple cells. Their earliest vegetation is a prolongation of the membranes of their spores, a name given to their reproductive seminal dust, which, though performing the office of seeds, differs from true seeds in being mere individual cells. From these arises a delicate, minute, webby growth, called the *mycelium*, which is the true vegetation of the plant, and which gives rise to the reproductive bodies at once, or builds up a receptacle which contains them. It is this *mycelium* which penetrates and destroys the object on which it is parasitic. It is made up of radiating and intertwining fibres, formed of rows of cells placed end to end. These are in many instances so minute that they easily traverse the tissues of living plants and the pores of solid wood. From this *mycelium* grow the spores, which, in their simplest form, consist of the terminal cell or cells, which drop off to form new plants. They are of the extremest minuteness, appearing to the eye like a mere cloud of impalpable powder. As we rise in the scale, special branches and processes are formed to bear the spores, either singly or in groups. Still more complex forms build up a special organ called *peridium*, within which the spores arise, contained in little sacks called *asci*."

The fungi are classified by Fries and Berkley substantially as follows, according to the mode in which the spores are borne:

1. Acomycetes, spores produced in little sacks. This order embraces the mildews, (*eresyphe*) the black mildews, (*capnodium*) and the whole great tribe of *sphæriæ*. The truffles (*tuber*) also belong here. "The mildews grow on the surface of fruits, and injure them more by choking up their pores, and mechanically confining them with their dense, felty growth than by abstracting their juices."

2. Physomcetes spores, growing in bladder-shaped cells, etc. Of no interest, perhaps, in this connection.

3. Hyphomycetes, spores naked, simple or aggregated on the ends of the fertile threads. To this order belong the mould of the potato rot (*botrytis infestans*) and many which induce decay in fruit, (?) etc.

4. Coniomycetes, spores naked on the ends of filaments or vescicles. "Here belong the whole family of rusts, smut and bunt, which creep through the tissues of living plants and finally burst forth on the exterior, and fructify in dense, dusty masses, which cover their whole surface. Different species affect different organs, some being on stems and leaves, others on flowers and fruit. They are the scourge of the farmer, whose fields they devastate. The savin trees (*juniperus*) are attacked by a peculiar gum (*podisoma*) which bursts from their bark and swells under the influence of moisture to a gelatinous mass. It also occasions the globular excrescent growth called cedar apples, from orifices in which it protrudes in long orange colored spurs, formed by the spores, tipping the aggregated mass of filaments. The black irregular scars on apples are caused by the *spilocœa fructigena*."

5. Gasteromycetes, mycelium gelatinous, floccose or cellular, giving rise to a stalked or sessile peridium composed of one or more coats, the spores borne on the apices of filaments lining the interior. This order includes the puff balls, (*œthalium*) which infests the hot-beds of green houses, etc.

6. Hymenomycetes, mycelium floccose webby, giving rise to distinct hymenium, borne either immediately on the mycelium or on special receptacles bearing the sporus on gills, wrinkles, tubes, prickles, etc. Here occur jelly like *exidiæ*, so common on trees after rains, the edible mushrooms, etc.

This classification, we are told, is uncertain, and liable to great modification. The subject is an obscure one, and has been but partially developed. These are also European classifications, not American.

Fungi are said to be "metoric in occurrence, depending upon peculiar states of the atmosphere. They generally appear in the greatest abundance in moist autumn weather, though some are found wherever there is moisture. Some depend so much on peculiar states of the atmosphere, perhaps electrical, that they appear suddenly and then disappear for awhile. * * * They absorb oxygen and exhale carbonic acid, performing the same office in this respect as animals, which they most resemble in chemical composition, in being highly azotized."

From these various extracts, which give but an imperfect idea of this interesting class of plants, the importance of further information on the subject is easily seen. The mildew of the grape and the gooseberry, the potato rot, the scab upon the apple and the pear, perhaps the pear blight, the knot on the plum, the cedar apples, the rust of wheat and oats, the ergot on rye, the smut on corn and other grains,

the curl leaf of the peach tree, and the rot of its ripening fruit, are all, more or less, connected with these little mischief-makers.

I have gathered together, for the purpose of opening up this subject, the observations of a number of writers, from which the particular diseases of which fungi are the cause, as being the origin, the attendant as arising from similar causes, or the result as being only the effect of disease, may be considered in the same connection. Beginning with the apple and pear, I quote from the Ohio Agricultural Report of 1863, researches of J. H. Salisbury, M. D., and C. B. Salisbury:

"During the summer of 1862, the blight began to affect the apple, pear and quince trees in Central Ohio, about the 12th of June. It made its appearance suddenly after warm, moist weather. Its invasion and progress was identical with the attack of blight which was so destructive to apple, pear and quince trees in 1847 and 1848, throughout the Northern and Eastern States. At different elevations the trees were affected in different degrees. Generally on and for a short distance above the third terrace from the stream bottoms—which corresponds with the line of suspended stationary vapors and fogs—the trees were much more affected than at higher or lower levels. Some trees in an orchard would be more affected than others adjacent on the same level. Often the more thrifty trees and most vigorous sprouts would be the ones most invaded. Sometimes twigs and limbs would commence dying at their extremities, and this death would gradually advance toward the base of the limb, always advancing faster in the layer of new, soft wood and bark (cambium) than in the more solid heart wood. At other times the death would commence in the middle of a limb—often several feet from its extremity—killing the new wood and bark first, and gradually advance from the point of starting up and down the limb, leaving the heart wood sufficiently alive to communicate, for weeks, sap enough past the diseased and dead surface rim to support the vitality of the extremity. In other instances a surface patch, merely, on the side of the limb would die. This disease progressed till about the first of August, when its advance seemed to be checked by the tissues of the young wood becoming too firm for the further invasion of the fungus.

"This plant is strictly a parasitic fungus, that affects organic tissues, and appears to be poisonous both to plants and animals. Its sporidia are inhaled in large quantities during its period of rapid productive development, and frequently the expectorated sporidia are found vegetating. That the inhaled sporidia produce more or less irritation of the pulmonary mucus membrane is quite probable, from the fact that in walking over rich, boggy grounds, where the surface is more or less broken, exposing the fresh peat soil, especially during the months of June, July, August and September; or in passing in the morning or evening over positions where hang the vapors from boggy localities, the fauces, throat and pulmonary membrane become

dry, feverish and congested, which lasts often for hours after removal from continued contact with the exciting cause; and from the further fact that the expectorated mucus, after leaving such localities, is found filled with the sporidia of the fungus.

"This fungus (sphærotheca pyrus, Salisbury) belongs to the group ascomycetes, to the order prisporiace, and the genus spalotheca; for a description of which, see the paper on the cause of the blister and curl in peach leaves, etc.

"One species of sporochisma, the S. spilocæa, affects apples, forming the black specks on the surface, which are occasionally so numerous as to make them unsalable.

"Where the trees are affected with blight, the fruit on such trees is sure to be affected, more or less, with this fungus (S. pyrus), either when green or just before and at its maturity.

"The pear trees and pear fruit are affected in the same manner, and by the same cause as the apple and the quince. Persimmon fruit is invaded also by S. pyrus, but it produces in them no signs of decay.

"In combatting the presence of this fungus, we have necessarily to rely more upon preventives than curatives. The preventives must be bodies that have an influence in controlling mucedinous growth and still are not injurious to the trees. Among these—that can be cheaply and readily obtained, and which, while they retard the growth of the fungus, act as manures to the trees—may be placed sulphur, sulphurous acid, sulphites, and sulphuric acid. These bodies are all more or less destructive to fungus development, and have the power of stopping fermentation. The wine grower controls the vegetation of yeast plants (fermentation) by burning sulphur in his casks. * *

"The sporidia are mostly in the circulating juices of the tree. * * The preventives, therefore, should be applied so as to enter the sap of the tree in its early circulation in spring. * * * I would suggest the digging away of the sod or surface and the application of a compost, containing either sulphur, sulphurous acid, sulphites or sulphuric acid. The refuse gas from the purifying vats of gas establishments, either alone or mixed with coal ashes, cinders from foundries, iron furnaces, and blacksmith shops, or the pitch from coal oil refineries, boiled down to asphalt, furnish cheap and appropriate materials for the purpose, containing the desired bodies for checking mucedinous growth. These bodies should be mixed with good soil (half and half) before being applied. These bodies all contain valuable nourishment for the trees. They will also guard against many depredations of insects. Care should be taken not to use the gas lime too liberally."

Dr. Kirtland, in a short paper published in the Transactions of the Indiana Horticultural Society, 1865, page 33, appears to have the same opinion of the fungoid origin of the fire blight, and lays down the two following hypotheses:

"1. The pear tree blight is caused by the poisonous impressions of the seeds (sporules) of a microscopic fungus.

"2. Several combinations of iron, especially the sulphate (copperas) will, to some extent, counteract the impression."

After citing several pertinent facts, the Doctor concludes:

"These views suggest the expediency of extensively applying a solution of the sulphate of iron, by means of a greenhouse syringe or garden engine, to the tops and foliage of trees laboring under any of the diseases suspected of a cryptogamous origin. * * * No injury has ever arisen to pear trees by the free use of a *saturated* solution of copperas."

In passing from this branch of the subject, I may say that in connection with the theory of the fungoid origin of the black specks and scabs on the apple, it is possible that the theory of Dr. Stayman, of Kansas, (given in the May number of the Horticulturist) may have some connection. The varieties of the apple set down by him as negative, electrically considered, may be found to contain a large proportion of those subject to the scab. A connection may thus be established here as well as elsewhere between the electrical condition of the atmosphere and the progress of fungoid disease.

I may say also that the apples apparently mostly affected by this fungus are (1) thin skinned varieties, such as the Early Harvest, Newton Pippin and Lady Apple; (2) varieties that are gross feeders, and hence often starved, as the Carolina Red June; and (3) those upon old trees, whose vigor is failing. The prevention here is generally high cultivation and manure.

To return to the Ohio report, on the "Blistering and Curl" in the peach:

"The disease attacks the young leaves as fast as they make their appearance. It produces its greatest ravages in this climate generally from the tenth of May to the fifteenth of June. By the fifteenth of June the new sprouts have nearly completed their growth, and but few new leaves subsequently make their appearance.

"The leaves of many different trees in different orchards were examined, and wherever a leaf was affected with the blister and curl, or either, much or little, there was found the mesh of interlacing and anastomosing filaments in its parenchyma; and often on its surface could be found moniliform fertile threads. In the healthy leaves there appeared no such growth."

This existence of fungi in peach tree leaves affected by the curl leaf, is confirmed by John J. Thomas, one of our best pomologists.

Our author continues:

"The peach fruit is often attacked about the time it is from one-third to two-thirds grown; but the fungus is usually neither thrifty nor prolific till the peaches approach maturity. If the fungus is in the trees, and the peaches escape until they begin to ripen, it then usually makes great ravages. At this stage of the fruit the mycelium

grows with great luxuriance in its tender, rich-flesh, and decay keeps progress with the advance of the mycelium. An entire peach will often decay in from twenty-four to seventy-two hours."

It will be seen from this that Dr. Salisbury believes the curl leaf and rot in the peach to be caused by the same fungus. Perhaps the experience of our peach growers in both diseases this season may furnish pertinent facts to this point. The rot has, I believe, been the most destructive thus far, in the early serrate varieties. What was the amount of injury done to the same trees by the curl leaf?

"Under this head," says Dr. Kirtland, "still another disease of our fruits should be noticed. I have watched carefully the sudden and premature decay of our plum crop, at the period of its ripening, for the last fifteen years. From hints afforded by Prof. Mitchell, and certain microscopic observations of my own, I was induced to publish an article in the *Florist*, in 1855, in which I imputed the origin of the disease to the forula, or some analogous species of parasitic fungi. The article was subsequently published in the *Ohio Farmer*, at Cleveland. The disease still prevails among us, and is sure to destroy all the plums which escape puncture by the curculio. It is, however, generally overlooked by pomologists, and its effects are charged to the depredations of that insect."

The knot on the plum tree may also have a fungoid origin.

Whether the apricot is injured by fungoid attacks in tree or fruit, I am not yet informed.

The grape, to which the over-strained attention of the horticultural world is now turned, has been, however, one of the greatest sufferers from fungoid diseases. On account of the antiquity of its cultivation, and its importance in the wine districts of Europe, this fruit has been more scientifically considered than any other, and its diseases more thoroughly examined and understood. I quote here, first from the transactions of the Academy of Science, St. Louis:

"Dr. Englemann exhibited specimens and numerous drawings of two species of fungi, which infest our vineyards to such an extent as to materially diminish the crop and influence the culture of the grape, at least that of the Catawba, in this region. The first is a species of Botrytis, and, perhaps, the same as Berkley's viticola (very near *B. acinorum*. Pers?) It makes its appearance in the latter part of June, on the lower downy surface of the Catawba variety of vitis labrusca (the only one extensively cultivated here), forming irregular confluent spots. The horizontal fibres of the mycelium have a diameter of .005 line, finer and whiter than the hair of the down with which they are interwoven; the erect fructiferous stems, about .3–.4 line high, and a little thicker than the horizontal fibres, bear numerous horizontal branches, upwards gradually shorter, the last divisions of which form very short pedicels, always two or three together, bearing oblong or oval, very deciduous spores, .008–.011 lines in the longer diameter. About the same time the mildew appears on the

pedicels, and often also on the young berries when they are the size of small peas, or smaller. Dr. E. never saw it on full grown berries. Those attached on their surface or on their pedicels soon fall off; but the most material damage is done by the mildew infesting the leaves, whereupon the greater part of the berries will gradually turn a yellowish brown at their base, shrivel from that point, assume a club shape, and at last dry up entirely, usually remaining adherent to the withered racemes. This he designated as the *brown rot.*

"The second kind of rot—the *black rot*—is brought on by a very different fungus, which he believed was undescribed by botanists. It evidently belonged near Ehrenberg's genus *naemespora*, and ought to bear the name ampelicida. It makes its appearance only on nearly full grown berries, exhibiting, in the first stage, a discolored spot on the side, but never at the base of the berry, about two lines in diameter, with a dark dot in the center. This spot soon becomes a light brown, and remains so, while the surrounding part of the berry gets darker, and exhibits a rough or (under a magnifier) pustulous surface; gradually, now, the berry shrivels up and turns black. The individual fungs are little spherical bodies (.07–.10 line in diameter) formed under the surface in large numbers, which, growing, elevate and at last burst the epidermis, then open at their apex by a small jagged hole, and shriveling with the berry, eject a more or less curled or twisted thread, which, moistened, becomes glutinous, and shows the innumerable oval sporules (.004–.005 line long), each imbedded in its coat of mucilage.

"These kinds of fungi were found either on distinct vines, or sometimes also on the same; they are very rarely seen on grapes cultivated in yards and on houses, but are very common, not to say universal, in our gardens and vineyards, in some seasons more so than others. It is said that vineyards further north, *e. g.*, in Northern Illinois, are free from these pests."

"Whether other diseases assist in the destruction of the grape, as wine growers will have it, he cannot, from his own experience, determine. He has never seen the erysiphe, which is so destructive to the gooseberry, and to vines in graperies, on grapes cultivated in the open ground."

William Sanders, at present in charge of the experimental garden at Washington, in an interesting paper in the Transactions of the American Pomological Society, gives some account of the character of mildew under glass.

Mr. Sanders holds that there are two distinct forms of mildew, one a form of erysiphe, mainly confined to exotic grapes, and the other a form of odium, chiefly found upon native varieties—the erysiphe, a white powder-like substance upon the upper surface of the foilage of exotic grapes, and sometimes seen on the leaves of the lilac, also on the English oak and hawthorn, and always on the foreign gooseberry.

"This mildew," he says, "is the result of *dry* air acting upon the

surface of tender vegetable tissue, and is chiefly confined to plants that are indigenous in cool or moist climates."

"Mildew," he continues, "is so generally associated with dampness and excess of moisture, that, at first view, it would seem paradoxical to refer it to aridity; but when we reflect that fungoid attacks are generally considered as a consequence of a diseased or decomposing organism, and not its cause, it is evident we must look for a cause prior to the appearance of the fungi. The question then assumes a different aspect, and we ask what occasions this disorganism in the grape plant? and I answer, that it is produced by the plant being subjected to a dryer atmosphere than is consistent with its healthy development."

The odium he describes as presenting itself "in small patches of a whitish color, on the under side of the leaves, and spreads rapidly. The affected leaves are readily detected after a few clear days; the sun turns these parts brown, and it then assumes that appearance frequently termed sun scald."

In this connection some idea of the character of the disease in Europe is given by a extract from Haraszthy's Grape Culture, etc., page 317.

"The Grape Sickness—Odium. This terrible disease has, within a few years, made its appearance in all parts of Europe. The sickness affects the leaves, the young shoots, and the grapes. It appears in a variety of fungus, termed Oidium Tuckeri, hardly perceptible at first to the naked eye, presenting a whitish cover, which will gradually form a connected crust. During a more developed state of this sickness, the entire vines are covered so much that at a distance of twenty steps it may be perceived. If the grapes are afflicted by this sickness early, will remain hard and unpalatable, and seem to be incompetent to develop further. As a remedy, flour of sulphur is used, which, after many experiments, has proved the best, especially during the first stage of the sickness. Road dust used in the same manner as sulphur is said to act well. A remedy is said to be successfully applied in the Tyrol: it is two pounds of gelatine dissolved in one pail of water, in which the grape bunches are dipped when the size of duckshot.

This sulphur remedy, which appears to be the panacea for fungoid diseases, is being extensively tried in America the present season, in connection with the badly made but well priced bellows of Mr. Erhard, and I believe generally with good results. As a mere remedy, it may do well enough; a good preventive would be far more valuable.

The gooseberry, particularly the English varieties, are largely subject to fungoid disease. This, according to the theory of Mr. Sanders, is attributable to "a dryer atmosphere than is consistent with its healthy development." He alludes, in support of this position, to the "expedients for the prevention of mildews on the gooseberry, and other

plants, such as planting in sheltered situations, mulching with salt hay, and application of salt to the soil."

The raspberry of the improved black cap variety, I have observed, the present year, affected, as to its leaves, with an orange colored rust that was quite fatal to the development of the season's growth.

It will thus be seen that nearly all of our fruit plants are in tree or fruit subject to devasting fungoid attacks. The evil does not end here, but prevails through the domain of the agriculturist as well. I give here an extract or two from the Illustrated Magazine of Art, volume four, page thirty:

"The genera which chiefly affect the cereal produce of our land [England] are the uredines and the pucciniæ. There are two species of the former that are almost equally dreaded by the farmer, one called the "smut" (uredo segetum), the "bunt" (uredo caries). Mr. Berkley says of the corn-infecting fungi, "the growth of these parasites depends so much on accidental circumstances, that it is impossible for the most experienced cultivators to guard against it entirely; but the evil is greatly lessened by careful choice of seed, and by steeping it in solutions of different substances which destroy the vegetative power of the sporidia of these parasites."

The other genus puccinia is of as evil a nature as the uredines. The disease termed the "mildew" in wheat is produced by one of these (puccinia graminis).

"But it is not on our cornfields only that a plague of fungi rests; these little pucciniæ attack the leaves of plum and other fruit trees, devour the fluids of our bean plants and scatter themselves in destructive armies over our raspberry bushes and our rose beds."

The subject might be pushed still further in this direction, before an exhaustive enumeration would be made of the plants subject to fungoid attacks. Leaving these, let us proceed to a consideration of the facts developed thus far; but, before doing so, let me quote a passage on the general character and production of fungi from "Boussingault's Rural Economy," page one hundred and four:

"The fungi which induce dry rot have been studied by Sowerby. Mr. Knowles signalizes two species in particular, one of which he describes under the name of xylostroma giganteum, the other under that of boletus lacrymaus. The xylostroma does not extend beyond the part where it is developed; but the boletus, on the contrary, is propagated with frightful rapidity, and disorganizes deeply and to a great distance around the texture of the wood where it once appears. These fungi are generally found on board ship between the planking and the ribs, in damp situations and where the air is scarcely if ever changed.

"The temperature most favorable to the development of dry rot has been found to lie between 7° and 32° Cent. or 45° and 90° F. These are the extreme limits; below the minimum vegetation languishes, above the maximum the fungi droop."

One of the most lucid statements of fungoid diseases is contained in the following extracts from the Horticulturist, 1862, page three hundred and fifty-two, on fungi and their relation to disease, by John Lowe, M. D., etc., before the Botanic Society of Canada:

"Whenever they (the spores) alight upon objects favorable to their growth, as upon decomposing organic matter of any description, they readily germinate, provided there be sufficiency of warmth and moisture, both of which are essential to their well-doing.

"It appears certain that, before any great damage can be done by these parasites, these must preëxist in the object of their attack an unhealthy condition of structure, resulting partly from being deprived of some chemical element essential to healthy growth, and partly to atmospheric changes which tend to foster a too rapid formation of cellular tissue, at the same time that they favor the rapid development of the parasite. The result of these changes in the plant is a lowered vitality, rendering it prone to the attacks of the fungus, which once having found a habitat, spreads with prodigious rapidity, and by setting in motion chemical changes similar to those already spoken of, soon involves the whole plant in decay. Examples of this will be familiar to you, as in the case of the potato disease, which, not many years ago, brought England to the verge of famine, and in Ireland, which depends almost solely on this crop, was the cause of untold misery and destitution."

The results may be stated as follows:

1. Fungoid growths attend a large class of those vegetable diseases which are most destructive to the products of the horticulturists or agriculturist.

2. It is uncertain whether these fungi are a cause, concomitant or effect of disease, but the prevailing belief is that they are merely the sequence or result of a condition already diseased, which they, however, greatly aid in extending and propagating.

3. This throws us back upon ascertaining the antecedent cause or causes and conditions of disease favorable to the development of fungi.

4. A wet atmosphere and soil is one of the most common of these, though, as has been seen, disease may occasionally arise from precisely the opposite condition of excessive dryness.

5. The electrical condition of the atmosphere seems sometimes to have an influence, as has been particularly noted in the case of the pear blight.

6. Warmth is a general, though not invariable condition.

7. A still or stagnant atmosphere is also conducive to the propagation of fungoid diseases.

8. Excessive changes in temperature induce the lack of vigor in tree or fruit, which renders it liable to attack. (See Mr. Sanders' article in Agricultural Report, 1862.)

9. Fungi seem to propagate under the above favorable conditions,

either by the sporules being taken up by the roots of a plant, and ascending with the sap, as Dr. Engelmann suggests in the case of the grape rot, or by coming in direct contact with bruised or cracked surfaces of fruit or tree.

10. There appears to be an accumulation of the sporules, or seed fungi, in a given locality, that makes long established grounds more liable to disease than new.

11. The most approved cure and preventive thus far is sulphur or its compounds, especially sulphate of iron or copperas.

Running over these statements, we find the opportunity of further elimination. The conditions favorable to fungoid growths are those also favorable to electrical developments, and to a certain extent those conditions may be regarded as one—the electrical.

Electricity, according to Dr. Carpenter, (Vegetable Physiology, § 384), "has evidently a striking influence on the rapidity of their growth, (some plants having been known to increase in the most extraordinary manner during thundery weather.") The electrical condition may, perhaps, therefore, be reduced to that of overgrowth and consequent feebleness in the plant, rendering it, as when otherwise weakened, liable to fungoid attacks.

There remain, then, two facts to be held in view:

1. Feeble vegetable growth, whether caused by excessive or insufficient development.

2. Fungi, also vegetable, ready to seize upon such enfeebled growth, especially in moist, warm and electric weather.

The first point in practice, then, is to secure a healthy vegetable growth. We must,

1. Cultivate enough, especially old plants.

2. Not cultivate too much, especially young plants.

3. Avoid wet roots—drain.

4. Avoid excess of dryness—mulch.

5. Avoid a dead atmosphere—plant on breezy sites, at good distances, with a good circulation of air under the plants.

6. Avoid excessive extremes of heat and cold—protect orchards.

7. Avoid shocking the vitality of the plant by cutting, etc.—be careful how you prune.

Failing in these points, or any of them, we may succeed, by the application of sulphur and its compounds, in such manner as to destroy the seeds or vegetation of fungi.

THE PEAR TREE BLIGHT.

CONCERNING ITS CAUSE AND CURE.

BY DR. J. P. KIRTLAND, OF CLEVELAND.

The disease known as the blight, or the fire blight, is at this day proving the most serious obstacle to the successful cultivation of the pear, in many sections of the country. Early in the present century it prevailed extensively in New England, coincidently with the spotted fever, and other disorders of a low grade of action, which at that period swept epidemically over that region of country. It was a popular opinion that all these diseases, both of the human family and the vegetable kingdom, arose from one cause—an opinion not, however, tolerated by medical men and men of science in that day.

Various theories have been advanced to account for the origin of this blight. Insects, frozen sap, electricity, excessive evaporation and exhaustion of the soil have, at different times, been assigned as the cause. Investigation of each fails to meet and explain the phenomena attendant on the rise, progress and results of that disease. It is time they all should be abandoned, and researches for a cause be extended in some other direction.

As a starting point in this undertaking, I will suggest another hypothesis, which may, perhaps, explain the pathology of the blight, and call into use an effectual remedy or preventive. Pathology, Dr. Webster defines to be "the doctrine of the causes and nature of diseases."

1. The pear tree blight is produced by the poisonous impression of the seed (*sporules*) of a microscopic fungus.

2. Several combinations of iron, especially the sulphate (*copperas*) will, to some extent, counteract that impression.

It will be understood that these two positions are merely hypothetical. If sustained by analogies, subsequent observations and experience, they will be accepted as truths; if not thus sustained, they will, of course, be rejected.

The extensive prevalence of the cholera over large portions of the globe, commencing in the year 1818, led medical men to seek for its cause. Dr. Cowdell, of London, in 1848, published "A Disquisition on Pestilential Cholera, being an attempt to explain its phenomena, nature, cause, prevention and treatment, by reference to an intrinsic fungus origin."

In 1849, Professor J. K. Mitchell, of Philadelphia, issued a more elaborate work, "On the Cryptogamous origin of Malarious and Epidemic Fevers." It abounds in numerous facts and correct reasoning, and should be consulted by every investigator of disease, animal and vegetable.

These publications attracted the attention of the medical profession, both in America and Europe, so long as that epidemic continued its

ravages, and the theories they advanced gained extensive credence during that time. They were, however, lost sight of when that epidemic subsided. Recently they have been substantiated as plain matters of fact, so far as malarious diseases are concerned, by the labors and investigations of Professor J. H. Salisbury, of Cleveland. In due time the public will be favored, from his own pen, with an account of his interesting and important discoveries. I will only add, in regard to them, the assertion that the cause of fever and ague is no longer a questionable subject. He has not only detected, figured and described with minute accuracy and beauty the species of fungus which produces that disease, but has propagated and cultivated the plant within doors to an extent sufficient to contaminate the atmosphere of the apartments, and induce the attacks of that disease among the inmates. His labors have also demonstrated that measles are of a cryptogamous origin, and it has long been known that *favus*, a disease of the skin, *muscardine*, a disease of the silk worm, and a fungoid growth from the larva of the melolontha or May bug, are of a vegetable nature.

It is well established, then, that a number of diseases of the animal system are produced by fungi. Under this name botanists comprehend not only the various races of mushrooms, toadstools, and similar productions, but a large number of microscopic plants, forming the appearances called mouldiness, mildew, smut, rust, brand, dry rot, etc. They are universally diffused in nature. It is difficult to conceive of a place where they do not exist. They are among the most numerous of all plants, in regard to genera and species, and with very few exceptions are deleterious in their impressions on the animal system. Even the palatable mushroom is always poisonous to some persons, and may become so to all, under certain circumstances. It is equally evident that they frequently occasion diseases in the vegetable kingdom. The smut of wheat and maize, the rust of wheat, ergot of rye and grass seeds, and specks, cracks and discoloration of the skin of the apple and pear are of this nature.

The microscopical examinations of Professor Salisbury and others have detected the presence of certain species, infesting extensively pear trees about the period of attack by the blight. They have made similar discoveries that lead to the conclusion that the curl of the peach leaf, the potato disease and the blight of pear trees, all have their origin from the cause assigned in my first proposition.

Under this head still another disease of our fruits should be noticed. I have watched carefully the sudden and premature decay of our plum crop, at the period of its ripening, for the last fifteen years. From hints afforded by the work of Professor Mitchell, and certain microscopic observations of my own, I was induced to publish an article in the *Florist*, of Philadelphia, in the year 1855, in which I imputed the origin of this disease to the torula, or some analgous species of parasitic fungi. That article was subsequently republished

in the *Ohio Farmer*, at Cleveland. The disease still prevails among us, and is sure to destroy all the plums which escape puncture by the curculio. It is, however, generally overlooked by pomologists, and its effect are charged to the depredations of that insect. A similar disease occasionally impairs our peach and apple crops to a less extent. Whenever it occurs to either of these varieties of fruit, the spurs and young wood blight or canker, and cease to be fruitful for several years.

If these discoveries and analogies establish, with any degree of certainty, the hypothesis of the cryptogamous origin of the pear tree blight, we have made important progress in laying down true indications for its cure or prevention. Among the means suggested for effecting that end, certain combinations of iron have already been named. The authority for such practice is founded on the following facts:

1. It is a popular belief that iron exerts a favorable influence over the health of fruit trees. Hence arises the practice of driving nails into the bodies of such trees and loading their limbs with scraps of iron. Both the belief and practice may be visionary, yet in such instances of popular belief investigation usually discovers them to be founded on some shadow of truth.

2. An intelligent and observing gentleman of Cleveland informs me that he prevents the curl of the peach leaf by depositing in the earth, about the bodies of the trees, fragments of rusty stove pipe and worthless pieces of iron.

3. Twenty-four years since I called the attention of the public to the isolated fact, without reference to any theory, that a large pear tree in Columbiana county, Ohio, with its body surrounded with many wagon loads of bowlders, scoria, scales of iron and accumulations from a blacksmith shop, retained its health, vigor and fruitfulness, while all other pear trees in that region of country had either died or were suffering from blight. (*Vide New England Farmer*, December 3, 1840, page 153.) At this late day this tree still continues healthy.

4. I recollect, in that reliable journal, *Hovey's Magazine of Horticulture*, some years since, a statement that the finest prize pears seen in the Parisian market were produced by investing the growing fruits with tufts of cotton or linen cloth, and daily, or oftener, moistening them with a solution of sulphate of iron. This treatment was said to result in developing the size, beauty and quality of the fruits to a high degree, and especially to free them of parasitic blotches.

5. Four years since, Mrs. Weller Dean, of Rockport, Ohio, informed me that blight might not only be prevented in healthy pear trees, but might be successfully arrested, in many trees, after it had made considerable progress, by means of repeatedly washing the bodies of the trees with a saturated solution of sulphate of iron (copperas) at a time when the sap is in active circulation.

This was a confidential communication, with the conditions annexed

that I should thoroughly test the plan, and if it should prove successful, I was to publish it, and, furthermore, if any merit or more substantial reward should be deemed due to any one by the public, she was to be the recipient.

The plan has yet been only imperfectly tried. Age and infirmities will probably prevent its completion by me. I will, therefore, report that I have tested it on a number of my partially blighted pear trees, while a great number had been left to die unmedicated. Of the former, not one has yet perished, while of the latter, very few survive. It has appeared, in every instance, to arrest the progress of the disease, and to impart a healthy condition to the bark wherever applied. The apparent results may have been coincidences and not the effect of the remedy. There is much false experience in horticulture and agriculture, as well as in medicine.

These views suggest the expediency of extensively applying a solution of the sulphate of iron, by means of a greenhouse syringe or garden engine, to the tops and foliage of trees laboring under any of the diseases suspected of cryptogamous origin. It also becomes a query whether the same agent may not be successfully employed at some period to counteract the potato disease, either by watering with it the growing plant or washing the tubers in it in autumn after they are dug. No injury has ever arisen to pear trees by a free use of a saturated solution of copperas.

In conclusion, I would observe, that the discovery of the cryptogamous origin of many disorders of the human system is effecting important changes in their treatment. May we not hope that an extension of these discoveries to the vegetable kingdom may prove equally favorable in shaping the practice in diseases of fruits and fruit trees.— *Written for the Cleveland Herald.*

CLEVELAND, December 20, 1864.

THE NEW POTATO BUG AND ITS NATURAL HISTORY.

BY BENJAMIN D. WALSH, M. A.

There is a new and very destructive enemy of the potato, which, within the last five years, has spread from Colorado and Nebraska into Iowa, and within the last year and a half has crossed the Mississippi into Illinois, and, as it seems, into Wisconsin also; whence in course of time it will probably travel onwards to the Atlantic, establishing a permanent colony wherever it goes, and pushing eastward at the rate of about fifty miles a years. The following extracts will give some idea of the way in which this insect operates, where it has once made

itself a home, and of the dates of its first appearance in different localities.

Thomas Murphy, of Atchison, Kansas, says that in August, 1861, they were so numerous in his ten acre garden, "that they would almost cover the whole potato vine, eating up everything green on it," and that he has "often in a very short time gathered as many as two bushels of them." (*Valley Farmer*, July, 1862, page 209.)

In August, 1861, J. Edgerton, of Gravity, Iowa, says that "they made their appearance upon the vines as soon as the potatoes were out of the ground, and there being a cold, wet spell of weather about that time, they devoured them as fast as they were up." (*Prairie Farmer*, August 29, 1861, page 116.) And from New Sharon, Iowa, Dr. Fitch was informed in 1863 "that some have been discouraged from planting potatoes, the ravages of this potato bug have been so great." (*Trans. N. Y. State Agr. Soc.*, 1863, page 798.)

D. Kilpatrick, of Linton, Iowa, under date of June 30, 1865, says "I took more than a gallon of bugs this morning from eleven rows of potatoes eight rods long. Eternal vigilance is the price of potatoes in this section." (*N. Y. Sem. Tribune*, July 18, 1865.)

Norman Matteson, of Iowa, June, 1865, says that "the only way they can grow potatoes there is to go over the field every day and destroy the eggs of the potato bug which are laid upon the leaves." (*Ibid.*, July 7, 1865.)

Later in the year "Dr. Trimble placed upon the table of the New York Farmers' Club a large handful of letters, boxes, bottles and packages from Iowa, all of them containing a repetition of the same sad story touching the terrible pest now afflicting potato growers at the West." (*Ibid.*, August 1, 1865.)

In August, 1864, I received from Professor Worthen, the State Geologist of Illinois, specimens of this insect, with a statement that "it is committing the most destructive ravages on the potato crop in the vicinity of Warsaw [a town on the Mississippi river in Central Illinois], so as to threaten the loss of the entire crop on many farms." I find that the same insect in the same year appeared on the potato in considerable numbers near New Boston, Illinois, another town on the Mississippi river, a little above Warsaw. In the autumn of the same year I captured myself two specimens in Rock Island, another town still higher up on the same river; and in 1865 it has been quite abundant there, completely destroying some pieces of potatoes and utterly ruining the egg plants in my garden; but up to this date it has not reached a point lying thirty miles to the east of us in such numbers as to be noticed by farmers. I hear from reliable sources that it has also swarmed on the potato this year near Mt. Carroll, a point situated about ten miles from the Mississippi, near the northern border of the State, and in the neighborhood of Alton, which lies on the east bank of the Mississippi, not many miles above St. Louis. It does not appear to have advanced as yet any considerable distance into the interior of

the State; but from the above facts it results that it must have crossed the river into Illinois in 1864 and 1865 at no less than five different points, the northernmost of which lies over two hundred miles in a straight line from the southernmost. Hitherto noxious insects in the United States have been found to travel from the east towards the west. We have here the first instance on record of a noxious insect traveling from the west towards the east.

But, it will be asked, where does this insect come from? And how does it happen that it did not trouble the Iowa farmers before 1861, and the Illinois farmers before 1864? I believe I can explain this satisfactorily. Unlike several other noxious insects, it is not a general feeder, but is confined to plants belonging to the botanical family *solanaceæ*, and especially to the genus *solanum*, which includes the potato, tomato, the egg plant, and a weed called the horse nettle, found more usually in the Southern States, but which also grows in certain localities in Iowa.* In 1864 Dr. Velie, the ornithologist of Rock Island, Illinois, and Dr. Parry, the botanist, of Davenport, Iowa, both saw this insect in very great numbers in Colorado, feeding upon a wild species of *solanum*—the *rostratum* of Dunal—which is peculiar to that region of country, and is not found east of the Mississippi river; and to the former gentleman I am indebted for numerous specimens collected by him on this plant, which are undistinguishable from those found on the potato. Assuming, therefore, that this wild *solanum* is the natural food of the insect, and that the region of country bordering on the Rocky Mountains is its natural home, its range would for a long series of years be limited by the range of the plant that it feeds on. But in process of time civilization marched up to the Rocky Mountains—potatoes were planted in Kansas and Nebraska and Colorado—and the insect discovered that one species of *solanum* was about as palatable as another. Having thus acquired a taste for potato leaves, it would naturally spread eastward from the potato patch, till it overspreads Iowa, and finally overleaped the Mississippi into Illinois. In confirmation of this theory, R. W. Hazen, of Fremont, Dodge county, Nebraska, says that "the potato bug which is so destructive in that region was first discovered in 1859, about one hundred miles west of Omaha City, whence they have been marching eastward annually." (*N. Y. Sem. Tribune*, July 18, 1865.) From Omaha City to Rock Island is over two hundred and sixty miles; so that, if the above statement be correct, it appears that the insect has traveled about three hundred and sixty miles in six years, or at the average rate of sixty miles a year. At this rate of progress it will reach the Atlantic in about fourteen years.

It may, perhaps, be worth stating here, that my own experience is that these insects prefer the egg plant to the potato, and it is well

*Mr. Terry, of Crescent City, Iowa, states that in his neighborhood it attacked the horse nettle in 1863. (*Prairie Farmer*, June 6, 1863, page 356.)

known that they prefer the potato to the tomato. Now, the egg plant is botanically more closely related to the *solanum rostratum*, on which this insect feeds in Colorado, than is the potato, the two former being covered with thorny prickles and the latter being smooth; and on the other hand, the potato is much more nearly related to the *solanum rostratum* than is the tomato, which last has by modern botanists been removed from the genus *solanum* and placed in a genus by itself. It would seem, therefore, that the closer a plant comes to the natural food plant of the insect, the better the insect likes it.

Dr. Fitch, in his article on this insect, published in the *Transactions of the New York State Agricultural Society*, for 1863, (pages 796 and 801,) asserts that "it has fallen upon the potato vines in numerous places all over the Northwestern States," and Mr. Cyrus Thomas, as quoted by Dr. Fitch, says that "it was found in abundance in Southern Illinois" previous to 1861. But both these gentlemen confound together two perfectly distinct, but very closely allied species, the *doryphora juncta* of Germar, and the *doryphora* 10-*lineata* of Say, one of which was really found in South Illinois previous to 1861, while the other was not, and one of which has never been known to attack the potato, while the other habitually does so. The former of these was first described by Germar in 1824, from specimens which he had received from Georgia, and was also received by Dr. LeConte, from the same State, ten or twelve years ago. In 1854 Dr. Helmuth, of Chicago, took this same species near Cairo, Illinois; and in 1861 Mr. Charles Sonne, of Chicago, captured very numerous specimens of it in Effingham county, Illinois, on hickory bushes, which they appeared to him to be feeding on. The latter species, which is the true potato bug, was never taken by any one, so far as I can find out, east of the Mississippi river, till 1864, and was first discovered by Say in 1823, in the regions bordering on the Upper Missouri river, and is quoted by Dr. LeConte and Rogers as being peculiar to Texas, Kansas and Nebraska. That Dr. Fitch has confounded these two insects, is proved out of his own mouth; for he expressly states that they are synonymous, (*Trans.*, etc., page 797,) although seven years before he wrote Rogers had pointed out the principal distinctions between them. (*Proc. Acad. Nat. Sc.*, 1856, page 30.) That Mr. Thomas must have confounded them, is indicated by the fact that he says that his species "occurs in South Illinois only on worthless weeds and low shrubs, and here it is not proved injurous to useful vegetation;" whence he infers "that it is only accidental that it has fallen upon the potato" in Iowa, and that "some peculiarity of the plants, state of the atmosphere, or other influence, may next year cause it to forsake the potato and take up its residence upon some other plant." (*Trans.*, etc., page 797.)

So closely, indeed, do these two insects resemble one another at first sight, that the Melsheimer Catalogue, in 1853, and probably Thomas Say, in 1824, considered them as mere varieties of one and the same

species. Yet each has its own peculiar characters—each was originally confined to a distinct region of country—and one of them, at all events, and probably both, are limited to a distinct botanical family of plants, and can feed on no other. For the benefit of those who are curious in such matters, I subjoin a table of the principal points of difference between the two species, which has been drawn up from a comparison of numerous specimens of each:

D. JUNCTA—eight specimens from Mr. Sonne.	D. 10-LINEATA—fifty specimens.
1. Edges of all the stripes on the wing-cases, except the outer edge of the marginal one, accurately bounded by an acute groove, which is regularly punctate with a single row of punctures.	1. The same edges studded with very confused and irregular punctures, especially towards the middle of the wing-case, often in two or three irregular series, and partly inside, partly outside the edges.
2. The second and third stripes, counting from the outside, always united behind, and generally before also.	2. The third and fourth stripes, counting from the outside, almost always united behind, only failing to be so united in a single wing-case of three specimens. In a single wing-case of two specimens, the second, third and fourth stripes are all united behind.
3. Legs rufous, with a black spot on the middle of the front of all the thighs.	3. Legs rufous, with the knees and feet black.

Both Germar and Rogers erroneously state, that *juncta* has only four stripes on each wing-case. It has, in reality, just as many stripes as 10-*lineata*, though I am informed by Dr. LeConte that his Georgia specimens have the outer stripe "indistinctly defined externally." What Say calls "variety *a*" of 10-*lineata*, found in Arkansas, is apparently, from his description, nothing but *juncta*.

The qustion whether the species that destroys potatoes has existed for an indefinitely long time in Illinois, or whether it has within the last few years migrated thither from the Rocky Mountain region, may seem to some of merely theoretical interest. It is, however, of great practical importance. On the first supposition, it is not probable that it will travel eastward; on the second supposition, it will most likely invade Indiana and Ohio within a few years, and finally pass on to the Atlantic States.

The new potato bug is not what naturalists call a bug, but a true beetle, belonging to the order *coleoptara*, or *shelly-wings*, and is rather more than one-third of an inch long, of so short an oval shape as to be almost as round as a grape, and cream-colored, with ten black lines or stripes placed lengthways on its back. Its wings are rose-colored, and present a beautiful appearance as it flies. We may call it in English "the ten-striped spearman," which is the meaning of the scientific name given to it. The above is the appearance presented by the perfect or winged insect, when its wings are hid under its wing-cases; but in the larva or immature state, it is a soft, elongate, six-legged grub, of a dull venetian red color, with several black spots, but without any wings, of course. There are four or five successive broods of them during the summer, and the larva of each brood goes underground to assume the pupa state. "C. V. R.," in the *Prairie Farmer* of August 8, 1863, who was the first to watch this insect through all its states, says that his specimens "hatched on the 14th of

June, and came out as perfect insects on the 10th of July, thus being scarcely a month going through all their changes." He confirms the conclusion at which I arrived in July, 1862, in the columns of the *Valley Farmer*, and which has been criticised and disputed by Dr. Fitch, (Trans., etc., page 798) namely, that the larva always goes underground to transform.

The insects commonly called "potato bugs," that have from time immemorial infested the potato throughout the United States, are also beetles like the "ten-striped spearman," but otherwise are in nowise related to it, being true blistering beetles, belonging to the same genus as the common "Spanish fly" of the shops, and raising just as good a blister as that does. Of these last there are three distinct species which have been known to attack the potato, one of a jet black color, (*lytta atrata*) one of a gray color, (*lytta cinerea*) and one of a yellow color, with four or six black stripes placed lengthways on its back, (*lytta vittata.*) Careless observers might confound this last with the "ten-striped spearman;" but the latter always has *ten* black stipes on its back, neither more nor less, and the former never more than *six*. Besides, the whole shape and structure of the two insects is as different as that of a horse is from that of a hog. There is this essential difference, likewise, between the habits of the two, that the blistering beetles only feed on the potato in the perfect or winged state, whereas both the larva and perfect beetle of the "ten-striped spearman" feed thereon, thereby, of course, injuring the vines to a much greater extent.

There are several species of lady birds (*coccinelidae*) which destroy the eggs of this insect; and as the eggs laid by many of these lady birds are of the same shape and color as those of the "ten-striped spearman," and are scarcely distinguishable but by their smaller size, being attached in the same manner to the leaf, care must be taken by those who undertake to destroy the eggs of the potato bug, not to confound those of their best friends with those of their bitterest enemies. The eggs of the "spearman" are yellow, over sixteenth inch long, cylindrical, rounded at each end, and more than twice as long as wide, and they are attached by one end in clusters of twenty or thirty to the under surface of the leaf. It appears that in some localities a true bug, belonging to the *scutellera* family, and similar to the large, stinking bugs often found on raspberries and blackberries, destroys the "spearman" while it is in the larva state, by puncturing in with its long beak and sucking out its juices. And Mr. Shimer, of Carroll county, Illinois, finds that it is attacked in the same way, while in the larva state, by another cannibal bug with its legs beautifully banded with black and white, (the *harpaetor cinctus* of Fabricius) of which he has sent me specimens, and which I have myself noticed preying on a great variety of other insects.

Almost the only remedy hitherto found to be effectual against

the depredations of the "ten-striped spearman," is hand picking them either in the egg, larva or perfect state, or shaking the larvæ and perfect beetles off the vines into shallow pans; for which purpose a tin pan with a lid similar to that of a common spittoon would probably be found very convenient, as the insects might then be shaken through the central hole from time to time, as they fall into the pan, and thereby be prevented from escaping. Dusting lime, ashes, etc., upon the vines has been found to be perfectly useless, and both coal oil and turpentine have been tried as preventives, and, in the words of Mr. Hazen, of Nebraska, proved to be "no more use than so much water, as they soon evaporate." Mr. Orin E. Priest, of Mosinee, Wisconsin, however, has found that "turkeys are a perfect remedy for the potato bugs;" and as the old fashioned potato bugs are deadly poison, and could not be eaten by turkeys with impunity, it seems to follow that his experience must relate to the Rocky Mountain insect, and, consequently, that this species had already, in 1865, made its way, not only into Illinois, but also into Wisconsin. "I had," he says, "a patch in my garden literally covered with the bugs, which was all cleared off by turning in the turkeys three or four times. Also a piece in the field, in which I turned a turkey with a brood of young; and there they have kept them all off, and to-day there is no sign of a bug to be seen." (*N. Y. Sem. Tribune*, August 29, 1865.) Turkeys have from time immemorial been employed occasionally for "worming" tobacco, the objection to which practice is that they injure many tobacco leaves. As the same objection will not apply in the case of the potato, they may probably be found very useful assistants in combating the "ten-striped spearman." At first sight we might suppose that common fowls would answer an equally good purpose; but I am told by those who have tried the experiment that they are comparatively inefficient.—*Practical Entomologist.*

ROCK ISLAND, ILL., September 23, 1865.

INAUGURAL ADDRESS OF DR. L. D MORSE.

PRESIDENT OF THE MERAMEC HORTICULTURAL SOCIETY.

DELIVERED JANUARY 12, 1861.

Gentlemen of the Meramec Horticultural Society:

For the high official position to which I am so kindly called by your votes, I desire to express my sincere thanks, and make my most pro-

found acknowledgment. This mark of distinction and high honor is the more gratifying, as it was received so unexpectedly, and after so few years of active service among you, either as a member of the society or as a citizen. It occasions in my own mind no little solicitude and distrust in regard to my abilities as your standard bearer, to carry forward the good work with that increasing interest which its importance so well merits. In accordance with a practice or precedent established by my predecessor—a practice which I sincerely wish to encourage—it now becomes my duty to address to you some remarks in regard to my views of the work before us, or to suggest subjects proper for your reflection in regard to our work; first,

OURS A WORK OF BENEVOLENCE.

Ours is really a labor of love to all who engage in it with the elevated motives which will readily suggest themselves to the mind of the philanthropist, the scholar and the Christian. We should engage in our work, not for our own profit only, but for the public good and for morality. We should desire so to exhibit the results of our labors and investigations before the society, as to instruct and encourage all to help make the world and the private homes of all more endearing, beautiful and useful. As our reports and our proceedings are each month spread before our countrymen by the press, much valuable information may be imparted to an inquiring public. In the language of a president of the Cincinnati Horticultural Society, "this is not a cause in which sordid avarice is expected to accumulate a few rusty dollars, that will perish with the using, but a cause of the most extended humanity; a cause of living nature and of nature's God."

No employment brings a man so near his Creator as horticulture. No cultivator can disregard any of the laws of creation without paying the penalty. The horticulturist, and, more broadly speaking, the agriculturist, is brought into more direct co-operation with his Maker than any other class of men. He has an interest in his productions other than their money value. The manufacturer depends upon his skill and his machinery in producing so many boxes or bales of his wares per day or per week. He foots up the result in so many dollars and cents. The lawyer depends for his success upon his sagacity and his legal lore, the physician upon his attainments and his skill, but the farmer stands in the closest copartnership with Divine Providence in the realm of nature. The ever active agencies of nature are constantly at work with him and for him, from the germination of the seed to the perfection of the ripe grain, the luxuriant vine, and the magnificent tree. Months are required for the maturity of his shortest lived crops, while years of nurturing care are necessary before he tastes the luscious fruit of his toil and watchfulness from others. He has an interest in these things beyond mere dollars and cents. He becomes at-

tached to the trees which have so long occupied his attention, and which flower for him in spring and fruit for him in autumn.

There is no occupation second to ours in the importance of its results, in promoting health, happiness, true patriotism and virtue. In this fast age, when too much time is absorbed in business and political excitements, and too little reserved for home and its enjoyments, and domestic comforts, it is a matter of real benevolence to endeavor to enlist greater interest and more people in the science of horticulture, that our homes may be improved, rendered more cheerful and attractive to our children, and the domestic happiness of all promoted.

"Thou shalt love thy neighbor as thyself," is the command of our Lord Jesus Christ, and when asked, "who is my neighbor?" He gave a very comprehensive meaning to the term. In these days of blind selfishness, it is difficult to convince men that it is for their own interest to obey the command; but we believe it might be easily shown, that so far as horticulture or farming is concerned, our own individual prosperity in dollars and cents will be increased by being neighborly—that the more thoroughly the science of horticulture is understood, and the principles of good farming influence all the farmers of a neighborhood, the easier it will be to cultivate well and profitably.

The imparting of knowledge does not impoverish. There is no surer way to secure accuracy of thought, or in our operations, than by giving instruction or explanation to others. We thus analyze our own views and practices, see our own failings, or where and how we may do better. We are drawn into a closer scrutiny of all our farm operations. We all may learn much from each others' practices and notions in farming, gardening and fruit culture. Our neighbors are all around us and all over the State, and they lie half dead, as regards their agriculture, as truly as did the man in the parable. We may act the "good Samaritan," and in so doing consult true benevolence as well as our own personal advantage.

INFLUENCE OF HOME SURROUNDINGS.

The science of horticulture is more intimately connected with the health and happiness, peace and prosperity, patriotism and morality of the people than is generally understood. Our rural homes, especially when their character is what it should be, are the places, above all others, best calculated to nurture and cherish all the finer feelings and better sentiments of our nature. It has often been said that man is a creature of circumstances; and it is really true. Man, in his character, physically and morally, is molded and controlled by the circumstances which surround him from his birth up. The same governing effect of circumstances or surroundings, is observable throughout the whole animal and vegetable worlds. "Man, too," says Professor Hodgen, "like the inorganic and organic worlds below him, is, in his physical conformation, his mental capacities and his moral

elegancies or deformities, but a creature of circumstances—but a living, breathing record of his surroundings. Change the soil on which the plant is grown, and the plant is changed;" change the food upon which an animal lives, and the animal is changed.

If you wish to procure a piece of hickory timber for a purpose requiring hardness, toughness and durability, you select it, not from the light soil of our hills, but from the rich alluvial soil of the river bottom. Every horticulturist is aware of the great difference in the same variety of fruit, as grown upon different soil, different stock, or in different climates. Contrast the small, compact, Scotch Highland cattle with the large, heavy Durham or Hereford of the more luxuriant pastures of England. One of the most remarkable examples of the change produced by circumstances, is the eyeless fish of the Mammoth Cave. They belong to the same species as inhabit the surrounding streams. They have lived in total darkness so long that their eyes have become obliterated. In some, the rudiments or eyes are found; in others, not the slightest approach to the development of an organ of vision.

It must be admitted that this law of development in accordance with surroundings, is a great law of nature, and obtains throughout all creation. It is emphatically true in regard to the surroundings of our homes, and their influence upon the present and future character of our children, and through them, I pray you to remember, upon the character of the nation. Especially is this an important truth in regard to homes in the country. About city homes generally there cannot be the attractiveness and variety and the multiplicity of endearments that are associated with the country home. In the city you may walk perhaps half a mile without seeing anything but stately brick fronts, with marble door and window sills, and all so near alike that a child could not tell his home from any other, unless aided by the nurse in reading the number. The inmates of such a home can only see a small patch of blue sky directly above them, and possibly a "wee bit" of green turf in the yard. What is there about such a home for the young affections to cluster around and cling to through life? What is there to individualize it—to make it different in the memory from hundreds of homes around it? What is there about it to foster love of home, of country, true patriotism—as compared with the country home?

Many of us are hundreds, or perhaps thousands of miles from the rural homes of our childhood, yet we remember, and will to the last of our lives, every feature and surrounding of that dear old home, the size and contour of the house, the well just behind it, with its old oaken, iron-bound, moss-covered bucket, from which we have drawn many a cooling draught; the neat grassy lawn, the location of every rose bush and shade tree, all are indelibly engraven upon the memory. We recollect the shape and location of every tree in the old orchard, and the character of the fruit that it bore, the trees where we

gathered nuts to store up for winter evenings, the shady nooks and dells where we rambled and played, the meanderings of the brook that ran through the place, and every favorite fishing place in it; these, and their association with the "loved ones at home," are hallowed memories, still vivid in our minds. The hills and the valleys, the rocks, and all the scenery of the old homestead were different from any other on the face of the earth. Such features constitute a home which the mind can grasp in its dreams in far off lands. The love of country, that patriotism which endures to the end, grows with the growth and strengthens with the strength of these home attachments.

The influence of home surroundings is a subject which has been too sadly neglected, and one which merits our most careful and assiduous attention. Horticulture, closely allied as it is with landscape gardening, is an indispensable aid in surrounding our homes with the best of comforts and those most essential to health, and also with very many of the embellishments and beauties so well calculated to make home interesting, attractive and elevating in its character. The influence of cultivating fruits and flowers is decidedly social and refining. The trees, the flowers, and fruits around our dwellings, are centers of interest, and while we are cultivating them and watching their growth, an insensible though strong influence is stealing over us. The tastefully constructed cottage that we have planned and erected, and surrounded with fruits and flowering shrubs and plants, ornamental trees and grassy lawns, has many time-honored associations connected with it, and the members of the household become attached to it as the home of their comfort and joy. The supplying of our homes with an abundance of reading matter of the best variety, in the shape of books and papers, with conveniences to the various members of the family, especially the little ones, for perusing these sources of improvement, should not be overlooked as one of the very best of home surroundings.

The neglect of our home interest has been productive of evils of a most serious character to individuals, families, communities and the nation. The disposition has been too common among our rural classes to grasp after too much land and too much wealth—to sell out and go where land is cheaper so as to add to the number of their acres. The vast majority own too much land and cultivate too much land. Too few are living as though they intended to make permanent establishments of their homes for the benefit of themselves and their children. Too many are content to live in small, crowded, illy-contrived and inconvenient houses, with scarcely a tree, or a shrub, or a garden about them, while they are absorbed in cultivating their broad acres, with the hope of amassing a little more wealth before they commence enjoying life, or surrounding their homes with the comforts and refinements of life. In the meantime, their children are likely to grow up, in a degree, uncouth, boorish and discontented, envious of their more

refined village or city acquaintances, and glad of any opportunity to get away from the old homestead, which they regard as a place of drudgery and comparative degradation. If they can avail themselves of sufficient education, they seek, probably, the overcrowded professions or the equally overcrowded and more precarious mercantile pursuits. Failing to secure their desires in these, they next resort to the hazards of politics, and our country is now flooded with ambitious political demagogues, whose greatest aim is political *eclat* and the spoils of office. And what is the result? Our Clay and our Webster, our Jackson and our Benton, and a host of others, pure-minded statesmen and patriots, have gone to their final rest, and their places are unfilled. In many respects, degeneration is apparent. We are proving ourselves unworthy the rich behest of our forefathers—incompetent to take charge of the mighty interests of this great Republic. We are to-day threatened with dissolution, revolution and results most saddening to the heart of every true patriot.

Politicians have been mainly instrumental in bringing about this state of affairs. We may charge them, principally, with causing the party strife which has raged to such a height. We may charge them with the expenditure, annually, of time and money enough, in party canvasses, which, had they been expended on our agriculture, would have made the country vastly more wealthy, and the people more prosperous and happy. When we ask them to make laws for the benefit of agriculture, we are sometimes told, in so many words, that agriculture needs no protection. The "Home Department of Agriculture," so earnestly recommended by the immortal Washington, has been neglected. Agriculture has received little attention from Congress. States have been tardy in fostering their agricultural interests. We have but now just commenced two or three agricultural schools in the United States. About half our people have turned politicians, and it would not be far from the truth to say that the other half have been duped by them. Do you doubt that the evils I have referred to are in a great degree due to the neglect of our homes—the neglect to make them temples of Pomona, and Flora, and Ceres—establishments of virtue and intelligence, of refinement and comfort? The family circle is the fountain head; make that pure, and the stream will flow on in peace and tranquility. Even now, the agricultural masses are generally sound and conservative, and there would have been no danger to the perpetuity of the Union, but for the infernal arts and machinations of hot-headed demagogues.

One of the most stable, intelligent and refined nations in the world is the English. A characteristic of theirs is a love of flowers, which pervades all classes, and I might add, a love of trees. There is a well known aphorism that "a bad man cannot love trees." The Englishman's home is his castle—his temple. Here are centered his sympathies and his hopes, his notions both of comfort and power, and his ideas of establishment and perpetuity. It has been well said that

"this proper appreciation of home comfort is the strength of a nation. Sudden revolutions never occur where a people have and feel the responsibilities of the household and prize its advantages. The disorderly in any country are always the homeless, whether rendered so by necessity or made so by a foolish choice or corrupt inclination. We call that young man homeless, who considers his father's house, or any other place in which he might be respectably domiciled, as only a shelter at night, and a place where, at stated hours, he may be fed. The assurance of good citizenship and of success in life, is the fondness of a young man for the sober enjoyments of the family circle. All evils flow from the disregard of the conservative influences of the family fireside. Parents who neglect to make their homes attractive to their children, are omitting a part of their education which no course of studies can repair. And the father, guardian or employer who has not the confidence of the young in regard to the manner in which their hours are to be spent, particularly after nightfall, really knows nothing of their characters. Long may the domestic habits of Americans be perpetuated; for, with the decadence of the love of home, the Republic will decay.

COMPARATIVE IMPORTANCE OF LOCAL SOCIETIES.

State, district and county agricultural and horticultural societies have become quite common, and their influence for good has been very great. I would not undervalue them, but I do wish to exalt the value of small local societies like this of ours. They are comparatively rare, and their importance is too often overlooked. They are adapted to the accomplishment of a work which cannot so well be done by the larger societies—the encouragement of rural taste, and the improvement of our rural homes. I think you will agree with me that this is a matter of vital importance. By our monthly meetings throughout the year, we are enabled to see the results of experiments and samples of crops, generally at the appropriate season. In the largest societies it is often more difficult to arrive at facts, owing to the differences of soil, climate and locality. The opinions of members often differ so widely, owing to these circumstances, that the inquirer after facts is confused, and we have to settle such facts for ourselves and for our locality.

IMPORTANCE OF EXPERIMENTS.

This leads me to suggest to you the importance of carefully made experiments. Each one of us may, during the coming season, institute and carry on, at little or no cost, several experiments in regard to the management of soils, methods of planting and cultivating, the effects of certain manures upon different soils and crops, the effects of insects, and many other matters of practical importance. These experiments, carefully conducted and observed, and accurately recorded,

would result in the accumulation of many most valuable facts of great benefit to ourselves, and a benefit to others to the extent to which our proceedings are circulated. This is an important subject, and I trust will receive the attention it so eminently deserves.

THE LADIES.

I cannot conclude without some reference to the aid and encouragement we have heretofore received from the ladies, and our dependence, in great measure, for our future success and prosperity, upon their favor. The ladies have been chiefly instrumental in supplying the fine dinners which have been the subject of frequent remark. They have graced our meetings with their presence, and taken a lively interest, frequently, in our discussions. They have ornamented our tables with beautiful flowers, boquets and floral designs. They have contributed in great variety and largely to the interest and beauty of our fairs.

In return, the chairman of the Flower Committee has taken commendable pains to correctly name the flowers presented, both wild and cultivated, and to communicate such botanical knowledge as the opportunity afforded. I may say further in return, as I have already pointed out, one of the chief objects of the society is the improvement of the homes over which the ladies preside. None know better than they how to appreciate the results of the horticulturist's art—the tasteful and well cultivated garden, the beautiful flowers and luscious fruits. It is not too much to expect, then, if we all do our duty, not only a continuance, but an increase of the interest which the ladies have taken in our association.

The ladies are the sharers of our cares and our toils, our joys and our sorrows, and as such their power to render home attractive is very great. We properly look to them for guidance in many matters of taste connected with our homes. The cultivation of flowers is particularly within their sphere; and these wayside apostles of purity, innocence and beauty, are too generally undervalued by the sterner sex. They are silent teachers of the gentlest thoughts and tenderest emotions. Their inutility—the very argument used by men against them—should lead us to generous thought—teach us that we live not by bread alone, and lead us to rouse our aspirations for something higher than mere sensual existence. Ladies, cultivate flowers, that you may improve the character of your husbands, brothers and children, and hasten the coming of the time when the earth shall be like a garden, and "the desert shall rejoice and blossom as the rose."

CONCLUSION.

In conclusion, I ask from one and all your aid and forbearance. Errors I shall doubtless commit, but I trust they will be errors of the head and not of the heart. Let us forget and forgive all errors in each

other, and yield our personal preferences, when necessary, for the good of the whole. In reviewing the past, I think that each member who has attended our meetings will readily admit that he has been greatly benefited by them. Let us, then, for the year to come, so deport ourselves, individually and as a society, as to merit the best results; trusting that a kind Providence will cause the year to close full of good fruits.

ADDRESS OF URIEL WRIGHT,

DELIVERED BEFORE THE STATE AGRICULTURAL SOCIETY, AT ITS FIRST ANNUAL MEETING, IN BOONVILLE, OCTOBER 4, 1853.

MR. PRESIDENT: I am here to-day by your appointment, to speak for the cause of agriculture. The scene around me proclaims your interest in that cause, and I share it with you, but in degree and quality how different.

It was not my good fortune to start in life in partnership with this fertilizing atmosphere and this teeming earth. My way has been along that path which runs over violated contracts and broken laws—a path too often darkened by the fierce conflicts of human interest or the bitter warfare of human passions.

My business is to deal with man in strife with his fellow man, or at war with the government in which he lives. I stand at the point where the antagonisms of society meet—where vice is most active, and frailty most conspicuous—whither human beings coming from all the diversified pursuits of life throng, in countless numbers—some to have justice awarded them, some to inflict its opposite, and others, an unwilling group, to expiate offenses.

In seeking to be one qualified to mingle in such scenes, my vision has been almost shut out from the broad, bright fields of nature. The laws of vegetable life do not lie within the narrow circle of legal science. Advocates at the bar, judges on the bench, do not teach how a plant must grow, on what it must be fed, and how, if sickness seize it, it must be cured. They look at soil only to determine boundary and title. They do not interrogate the earth to find out its ingredients—they put no questions to the air to discover its elements. The law has its mysteries, but the "mysteries of the hail," and snow, of the dew and rain, are not of them.

But although thus cut off by vocation from the pursuit and study of agriculture, I yet am interested in its prosperity.

It claims my regard as the earliest and noblest occupation of man.

It appeals to my interest, as the supporter of every other interest in a State. As a man claiming to be civilized, I venerate it as an essential element in all civilization. As an American, I hail it as the surest defender of the liberty of my country. By these more general claims I stand connected with the occasion and its theme—but you are united to both by closer ties.

To you, agriculture, as an art or science, can never become an abstraction; you look upon it always in the concrete. The strong tie of interest binds you to the soil, and your success in life depends upon its proper culture. The subject comes home to your bosoms and business. How to sow? and how to reap? are questions which have their origin not only in your vocation, but in your relations also. As husbands, fathers, masters, you put such questions, and the noblest feelings of your nature become interested in the reply. On that reply may depend your ability faithfully to discharge the duties incident to those relations.

The Government has given you a large discretion as to the manner in which such duties shall be discharged, but the broad confidence of our laws does not impair the obligation of that trust. How your children shall be reared, educated and fitted for success in life, and for bearing their part in the maintenance of constitutional liberty, is not penned in any statute of our State. The law of the domicil is with us an unwritten code. We trust the instincts of nature, enlightened by civilization, liberty and religion—we impose no sanctions for the breach of them. But beyond these endearing relations (furnishing, as they do, active stimulants to inquiry), your broader relations to all other pursuits and avocations impose upon you the duty to know everything that may advance the cause of agriculture. The soil untilled for a single year would spread famine over the earth. Your philanthropy asks for knowledge—your interests demand it—your affections in their loftiest yearnings crave it.

The daily mysteries of vegetable life around you make knowledge a necessity.

These are some of the considerations which have brought you here to-day, to the first industrial exhibition of the agricultural society ever organized within our limits under the patronage of the State.

I wish I could bring the tribute of knowledge to this beginning of a new era in the history of our agriculture. I would seek no higher honors than to identify my name usefully with a movement of the human mind, directing the energies of our people and the authorities of our State, on that line of achievement which may elevate the art of agriculture, in its widest scope, to the dignity of a science.

I feel, sensibly feel, that to me such honors can never attach, but I trust that I may not entirely fail to show that the highest attainments of science are yet to be won from the soil she has neglected, and that the highest duty of the State is to place agricultural education within the reach of all her sons.

I leave behind me many topics upon which I have reflected with pleasure—intimately connected with my theme. I pass by many inviting fields which have allured thought since I accepted your invitation, and proceed to the consideration of the two propositions just advanced. In a single address I do not know how better to appropriate the time allotted me in this interesting scene.

And first: can science be successively applied to agriculture? Is all known that can be known, which tends to multiply the fruitfulness of the earth, and perpetuate its fertility? Are the laws of vegetable life within the reach of the human mind, and if so, will a knowledge of them aid the agriculturist in the practical operations of husbandry?

I put the subject in the interrogative form, because I know that a wide prejudice has already answered—it is a prejudice hoary with age. It has entered the halls of legislation, but is not the peculiar possession of that class of politicians who do not rise to the stature of philosophical statesmen. Unhappily, by a hurtful contagion, it has spread to some themselves tillers of the soil.

Now a small portion of this prejudice must be treated as a disease of the mind, which no sanative can heal, but much the larger part of it rests upon plausibilities, within the reach of correctiveness. Some of this error may yield to the unaided power of a definition.

Science is not merely theory, nor is it mere practice. It is neither speculation or experiment. Science is knowledge. It may be reached in many ways—sometimes by a blunder—ofttimes by accident, or it may be won by the harder and nobler toil of the mind, working by the rigid process of induction through series of experiments; but, however attained, it is power—power magnifying the resources of man, and convertible to his use. Every successful farmer is, to some extent, a scientific one. There cannot be continued success in farming against the laws of nature. Whether he knows it or not, he has, in the given case, applied labor in harmony with these laws. To maintain otherwise is to rebuke the intelligence of God.

The widest prejudice against the application of science to the art of agriculture has arisen from confounding science with the operations of men who have gone to the fields, book in hand, trusting to reach judicious culture by a prescribed formula. I deliver over all such socialists and smatterers to the appropriate awards of a poetical justice. If the "book farmer" has not succeeded, his failure was the result of one or more of three causes: First, the book did not contain the requisite science or knowledge; second, if it did, the farmer did not find it out; or third, he had not the practical experience or industry to apply the knowledge the book contained. I join in no crusade against books. They have been, and are, and will be in all coming time, the repositories of science. They are the caskets which contain the jewels of the mind, wrought by genius in every age. Yet, unlike other casks, while they collect they distribute also.

But, gentlemen, that would be indeed a rare book—invaluable as rare—which contained all the science necessary to the farmer. Such a book has never yet been printed. The art of agriculture demands the aid, not of one only, but of many sciences. The aggregate fills the entire circle of the natural sciences. The elements of agriculture have rested on botany. The indications of vegetable physiology have been, and yet are, the chief guides of the practical farmer.

Mechanics and hydraulics are as essential to his yearly operations as the seed he sows. Geology only can accurately teach him the origin of his soils, the cause of the diversities which they frequently exhibit, not only in the same farm, but sometimes in the same field; the nature and differences of his sub-soil, and the advantages or disadvantages he may expect in bringing them to the surface.

Meteorology makes for him her tables, showing the highest, the mean and the lowest temperature, and also the quantity of rain that falls during each day and each month in the year—knowledge eminently useful for the proper culture of the land. While chemistry discloses the composition of soils, the composition of the atmosphere, the food upon which every plant must live, from whence obtained, whether from the earth or the air, the deficiencies of soils to the growth of plants, and how the deficiency may be supplied, and when, the adaptation of particular soil to the growth of particular plants, the causes of exhaustion of soils, the means of restoration, when nature will supply deficiencies, and when man must do it for her, and how the principles upon which alone a judicious rotation of crops can be applied to a given soil; in a word, the office of chemistry is to explain the processes of vegetable life in every stage of its being, and to show forth the results of decay and death. To this science agriculture must ever look for its highest achievements; other sciences may be important auxiliaries in every step of her progress, but chemistry must conduct her to prosperity. However dissevered, as they have been; however strife and ill-feeling may have come between them; however jealousy and ignorance may have disturbed their union, agriculture and chemistry are inseparably united, and what God hath joined together let no man put asunder.

Look at the art of culture as it now obtains in our country—is it not essentially a chemical art? You put lime or gypsum or guano on your land—what are they but chemical agents? and why do you add them to the constituents of your soil? Is it not solely from the hope of chemical action? If you drain your meadows or irrigate them, are you not seeking chemical action? If you sub-soil, what are you in search of but chemical action? If you let your fields lie in fallow, what are you waiting for but chemical action? If, instead of rest, you practice rotation in crops, on what principle can you explain your practice other than upon the laws of chemical action? Even your mechanical operation of plowing, what is it but a means of inducing or facilitating chemical action? And when you come to the composi-

tion of your manures, whether vegetable, or animal, or mineral, or all combined, you are engaged in that which demands a large knowledge of the laws of chemical action—knowledge of the constituents of your soil—knowledge of its deficiency—knowledge of what will supply that deficiency—and knowledge how and from what source that supply shall come.

It is thus manifest, beyond the reach of cavil, that the agriculturist, whether he knows it or not, and in spite, it may be, of the profoundest ignorance of chemistry, is nevertheless practically a chemist.

Will a knowledge of chemistry help the experimenter to his desired result? Ought he to rely upon the ascertained and established truths of science, or trust to chance? That is the question—that is the question. The question of this hour, the question of this age, put by me, with a gravity due to its importance, to every agriculturist in the land, to all who are indirectly interested in the products of the soil and to the public authorities. Upon a question so vital to the State, so big with results, so full of weal or woe to us in our day and generation, and especially to those who shall come after us, I would invoke the shades of our mighty departed for an answer. If it could be, Fort Hill and the Hermitage, Marshfield and Ashland, Monticello and Montpelier would each find a tongue, and rising high above them all, the solemn, benign and parental voice of Mount Vernon would give power and emphasis to the joint reply. Do you doubt what that reply would be? Differing widely as to the actual adjustment of powers in our federative system, and sometimes apart upon the measures of policy, no dissension ever came between them as to the true position of agriculture. They loved the fields, and with a love that defied the intoxicating influences of power and the seductive spell of high station. Their graves are farmers' graves. At the capitol, amidst cities, on the summits of mountains, cenotaphs and mausoleums speak in enduring marble the nation's gratitude, but their bodies moulder in the soil they tilled. When was it in their lives that a sentiment escaped from either of them adverse to the healthful influence of science and culture?

In their day and generation, amidst the monopolizing cares of State, when did either of them lose an opportunity to avail himself of any achievement of the mind calculated to increase the fertility of the earth? Or when did they fail to give to science, on her pathway of toil, a cheering word? They were philosophers as well as statesmen, and in the quietude and repose of their fields; in that "solitude" which is "the school of genius," in the contemplation of nature working out in her mighty laboratory the processes of vegetable and animal life, their minds expanded to the measure of true greatness.

Some of them were surrounded by a philosophical apparatus, and worked in their home laboratories. Mr. Jefferson, while minister at the French court, found time, amidst the engrossing cares of diplomacy, not only to watch the throes of a revolution, but to make himself

master of every new discovery in science. The interest of agriculture engaged his special attention; every new implement of husbandry—every new mode of culture—every plant useful to man not grown in our land, became the object of his regard. His well known journey through the interior and south of France, and over the ranges of the lesser Alps, had for its motive the pursuit of scientific agriculture. If in that day an agricultural school or college could have been found in France or Switzerland, who can doubt that he would have been drawn to it by an irresistible attraction? Mr. Madison, on his skillfully conducted farm, up to a late period of his life, kept pace with every advance of chemistry. His letters—the letters of Washington and Webster—form a beautiful and instructive portion of our agricultural literature.

But I turn from these bright names to call you back to your own farms, and to your own operations in husbandry.

You put gypsum on your land. In one district of country its effects are lauded, in another its efficacy is doubted, while in a third it is decried. How is that, and why is it? Is it the freak or fickleness of the mineral? Is the result in each case a chance medley, or does it spring from cause? Just so sure as that the earth we inhabit moves in its orbit round the sun by law, so sure is it that the result in each case is the effect of principle, and that principle science can discover.

Again, you put upon your soil animal manure—you find its action powerful and its effect permanent. Other animal manures act only for a time, and their effect is speedily exhausted. Do you know the cause? Chemistry can answer.

"Does a mixture of animal and vegetable manures prepare your land best for certain kinds of grain? Do you employ common salt, or nitrate of soda, lime, the ash of wood, bone dust or any other substance with advantage? In all these cases you observe chemical results, which you would be able to control and modify did you possess the requisite chemical knowledge."

Some barren soils are capable of reclamation—others not profitably under the present state of science. Is it not a matter of importance to be able to distinguish between them? But what is more particularly applicable to us—some soils that to the eye seem good will not produce. Now, by what rule will the common farmer work to give fertility to such land? Has he any rule? Ignorant of the disease, how shall he apply the remedy? Shall he experiment in the dark and work on as the sanguine Micawber lived—"in the hope that something will shortly turn up?"

By a beautiful economy in nature, many of the inorganic elements necessary to the growth of plants exist in the soil in quantities so small as to become appreciable only by a refined analysis. How shall the practical farmer detect their absence by the best use of his powers of observation? I repeat the question—how shall he work? Blindly in the dark, or growing tired of unprofitable toil, shall he shift the

responsibility by selling out, or shall he call upon science to tell him the exact chemical constitution of the earthy part of his soil? Perhaps the reply of the chemist may be, "your soil is excellent, and wants only a small portion of what is known to science as phosphoric acid, which you can supply at little more than nominal cost." Or perhaps he may suggest the presence in the soil of some one of the salts of iron, or other noxious principle easily and cheaply deprived of its hurtful influence by the application of well known chemical agents. In reference to such soils, Sir Humphrey Davy, more than half a century ago, when agricultural chemistry was comparatively unknown, said—"the application of chemical tests to such soil is obvious—it must contain some noxious principle," (or be deficient in some necessary element, adds Johnson thirty years later) "which may be easily discovered and probably easily destroyed. Are any of the salts of iron present? they may be decomposed by lime. Is there an excess of silicious sand? the system of improvement must depend on the application of clay and calcareous matter. Is there a defect of calcareous matter? the remedy is obvious. Is there an excess of vegetable matter indicated? it may be removed by liming, paring and burning. Is there a deficiency of vegetable matter? it is to be supplied by manure." Since his day soils are better understood, and in many cases chemistry can now accurately determine what a soil must contain before it will produce a given crop.

In our own country the value of chemical tests applied to the soil is abundantly established. I cite a few examples out of many furnished me by your secretary, my friend Minor, to whose enterprise and zeal you and the State are largely indebted for your present organization.

In the Agricultural Transactions of the State of Massachusetts for the year 1851, (a book which I would commend to those engaged in diffusing agricultural literature among our people,) I find recorded some authéntic facts which illustrate the matter in hand. Professor Mapes, a gentleman of large attainments in various departments of science, furnished the results of the analysis of the soils of more than one hundred farms in the State of New Jersey. Take two or three of them:

He analyzed the soil of a field of J. J. Scofield, of Morristown, on which the owner desired to raise rutabaga turnips. It was found deficient of the following constituents of that crop: Phosphate of lime, potash, organic substances, including a slight quantity of animal matter. These being supplied, the result was fourteen hundred bushels to the acre, as certified to the Legislature!

He also analyzed the soil of a field for Dr. John Woodhull, which he had appropriated to the growth of wheat, and from which he had the preceding year obtained less than fifteen bushels to the acre. After supplying the deficient constituents, he obtained the succeeding year fifty-seven bushels to the acre.

Another instance I cite to show the value of sub-soiling, under scientific direction. The farm of Robert Hennie was deficient in its surface soil. Its sub-soil analysis proved to be rich in substances not contained in the surface soil. He prescribed sub-soiling and a thorough mixture of upper and lower soils. The preceding crops were fifteen bushels of corn and sixty bushels of potatoes to the acre, but the succeeding one hundred and fifty bushels of ears of corn and three hundred and fifty bushels of potatoes. Once more: a field of a gentleman in Maryland had become barren under culture. It was reduced to a yield of one bushel per acre. He applied to a distinguished chemist, who, on analysis, detected the absence of but one element of fertility—phosphoric acid. That element was supplied, and the product was twenty-nine bushels of wheat to the acre. It is needless to multiply examples—these establish the connection between science and agriculture—but the union must be more complete.

I value at a high rate the practical skill, obtained by a long course of observation, possessed by many of our farmers. Common sense, sound judgment, have done much for the soil, aided by little exterior information; and the light of science will never dispense with the use of such qualities; but we cannot shut our eyes to the fact that, under our present system of culture, the soil of our country is undergoing exhaustion. Its richness, in the valley of the Mississippi, will postpone the ultimate period of barrenness, but it must be witnessed by those who shall live upon the earth when we have passed away, unless the process of exhaustion be arrested. The law of supply and demand explains both the evil and its cure. That law is the great primary law of nature. Why does this noble river, on whose banks we stand, roll in ceaseless and perpetual flow on to the ocean? Whence comes its eternal supply? Ask the sea and the sun and the cloud, and they will answer. In this invisible air around us are four elements, without which there can be no living thing—neither vegetable nor animal. Without them there must be universal death. Every moment in our lives we must have them, and so must every plant. The vegetable and animal kingdoms are the active, ceaseless, eternal consumers of these commodities. Why are they not exhausted? Why is it that the atmosphere everywhere still furnishes a supply to this never-ending demand? Go to Pompeii—dig up from its ruins a vase which has been covered by the lava of Vesuvius for eighteen centuries—analize the air it holds—and you will find in it the exact amount of oxygen contained in the same volume of atmosphere that plays around the highest peak of the Alps. Whence is this universal supply? The answer is—every animal that breathes, at every breath, absorbs oxygen and gives out carbon, while every plant, in its respiration, takes in carbon and gives out oxygen. The indestructibility of matter perpetuates this exchange of the two kingdoms through an eternal circle. This is the operation of organic life, but decay and death are pledged to the same office of restoration. Burn a plant in flame, and it dis-

appears—all save its ashes. In life its substance was mainly composed of the four elements—oxygen, carbon, hydrogen and nitrogen—and these it drew from the air, while it contained also small portions of several substances which it did not get from the air. Now, in the process of combustion, death comes, and at the moment of dissolution, every element is set free, and what is beautiful, each element knows its place, and whither it must go. The elements of air have gone to their home, and what came from the earth is left upon it.

In regard to the laws regulating the suply of nitrogen—an element which, in the form of ammonia, is so intimately connected with vegetable life as to claim the special attention of the practical farmer—there is more uncertainty. Whether the atmosphere be its primary source, as most chemists conclude, or whether Liebeg be right in his conclusion, that "it is a part—a primary constituent of the globe itself"—all chemists are able to trace the various secondary sources of supply of this essential fertilizer, and all concur in showing that upon man devolves a large portion of the work of restoration. It is the great office of science to distinguish between the cases in which nature does and does not need the aid of man. Her processes are of themselves sufficient for her purposes—she can clothe the earth in verdure, and by decay and death she renders that verdure perpetual—but man tasks her powers, and by continued drafts on her fertility he may reduce her to barrenness. To prevent this, what she demands of man is, that after he has used what he has taken from the earth, he shall bring it back to her exhausted bosom; or if he will not do that, let him go to her magazines of supplies, wonderfully and bountifully provided, to meet the exigencies of his improvidence. The immense coal fields which lie imbedded in the earth, of vegetable origin, furnish a sample of her prudent forecast and care. The nitre beds of India and South America are other instances—and in our own country, on the shores of Lake Champlain, in New Jersey and New York, beds of phosphorite have been discovered, more valuable than mines of gold. To supply what they furnish England expends a half million of pounds sterling every year. She sends her ships abroad, to other countries, and digs for bones on the field of Waterloo. And nearer to us, the Mammoth Cave, in Kentucky, constitutes an inexhaustible nitrate reservoir. I venture to predict that one of the proudest achievements of science will be to convert the yet undeveloped resources of the mineral kingdom into the richest and cheapest fertilizers of the soil. I venture, also, to affirm that science will never reach her highest attainment for agriculture, until she has perfected a sytem of specific manuring—that is, a system of manuring by which one or many chemical agents shall be classified and adapted to the supply of a given deficiency, or the correction of a vicious quality of the soil.

General and indiscriminate manuring must, as it seems to me, give way as science advances. The ordinary mode in which farmers supply nitrogen is by the manure pile, collected from the stable and the

barnyard; and animal manures are richest in this particular substance—but in them it takes the form of ammonia, and ammonia has wings so nimble that they need clipping. Science can only perform that operation well. There is something very curious and interesting in nitrogen. It presents an anomaly in nature. If it had anything to do with the affairs of State, some politicians would affirm that it presented the beau ideal of what is sometimes called a "masterly inactivity"—others might maintain that it was a happy illustration of the "manifest destiny" doctrine; while an ardent Whig would be sure to claim it as a "conservative and against intervention"—it would become a Talleyrand in politics, and could live, in favor, under every dynasty. In the air it is in the midst of very active and combustible agents, that have a wide range of affinities, prompting them to unite with many substances; but nitrogen is characterized by its utter indifference to all other substances—it has an apparent reluctance to enter into combination with any of them.

Whenever, by the force of circumstances, it is compelled to unite with something else, it remains in union, only because of its tendency to remain in the same place—and the slightest cause will disunite it from its compounds—yet it is an invariable constituent of plants, and, during their life, is subject to the control of their vital powers; but the moment the mysterious principle of life ceases to influence it, it disengages itself, and promotes decay by its escape. It forms much the largest portion of the atmosphere, and saves nature from total destruction, by the check which its indifference opposes to the activity and energy of oxygen. It is the great conservative power of nature; but its disposition to be released from all other substances, and the slight force necessary to its escape, demand the minutest care of the practical farmer, when he wishes to restore it to his soil. This gas and hydrogen form ammonia—and the volatility of the ammonia of animal manure must be fixed, or you can never cast it to your fields. The agency of man in the supply of nitrogen is a clear necessity. It is doubtful whether the nitrogen of the atmosphere, either as gas or in solution in water, ever enters directly into the living plant. If at all, it does so in quantities too small for its supply. It comes to it in the shape of compounds, as ammonia, nitric acid, and other compounds, some of which are produced by the decay of animal matter.

The volcanoes of the globe furnish ammonia—the consumption by burning of coal fields contributes indirectly to the supply of nitrogen. The electricity of the atmosphere aids in its production; but the farmer cannot rely upon these operations of nature for supplying the continued demand for nitrogen created by continued cultivation. Animal life is a great consumer of this element. The fields are exhausted of it by the demands of cities, crowded with population, and, unhappily, what is thus carried away never returns. Lastly, this

element is much less abundant in nature outside of the atmosphere than any other of the organic elements.

The supply of the remaining element, hydrogen, is not, in any important respect, dependent upon the agency of man. Its main source is water, in its various forms, and the artificial application of this bountiful fluid, to the garden and the field, seems to be the limit of man's action in the premises.

I pass from the elements of air to those of earth. When a plant is submitted to flame, we have seen its organic elements are given back to the air, while an ash remains which fire does not destroy. This ash constitutes the organic portion of plants. It forms so small a part of the plant that for a long time it was supposed this organic matter, derived from the soil, was accidentally present, and could be of no essential or vital consequence to the plant. Science has forever expelled this error. Careful experiments have shown—

1st, That on whatever soil a plant is grown, if it shoots up in a healthy manner and fairly ripens into seed, the quantity and quality of the ash is nearly the same; and,

2d, That though grown on the same soil, the quantity, and quality of the ash left by no two species of plants is the same; and that the ash differs more widely in these respects the more the plants differ from which the ash is derived.

It is thus certain that these inorganic constituents contained in the ash are essential parts of the plants—that they cannot live a healthy life and come to perfection without them; and the practical consequence is, that the farmer must supply these inorganic substances to every deficient soil. If anything was needed to make this conclusion absolute, it was supplied in the experiment which establishes that if you take a healthy young plant and place it on a soil where it can obtain this inorganic matter found in the ash of the mature plant of its species, it droops and dies.

Who, in view of this great truth, can deny the importance of science to agriculture? It establishes a clear relation between the kind and quality of the crop, and the chemical composition of the soil on which it grows. It makes it as easy to know how to feed a plant as to feed a sheep. It shows how some manures permanently fertilize a soil, and how some crops permanently impoverish it. It explains the action of mineral substances upon plants, and how the dead earth is turned into food for the living. It shows what a soil must contain, and thereby how it must be improved. It is a truth that must ultimately control all the important operations of husbandry. It is not confined to the fields or the meadows. It can be carried into the orchard and the garden. The root of a tree selects from the soil the kind and quality of inorganic matter required for its life. Any other tree may be grafted upon it, provided it requires the same kind of inorganic substances, in nearly the same proportion, in its natural state. On the orange the lemon will grow, because the inorganic

food of each is nearly the same; but the fig and grape cannot be ingrafted on the orange tree. They want more lime and potash than the orange wants for its life, and the air cannot furnish them to the graft. The dependence of the graft for its inorganic supply is on the roots of the tree upon which it is ingrafted.

These inorganic elements, identified with vegetable life, are twelve in number, found generally in combination with each other or with oxygen. And here the agency of man is a fixed necessity. Over this wide field of science it is not my purpose to pass. I do not know how to tread it; but I do know that chemistry over every foot of that way is the best guide of the practical agriculturist, even where his steps are most familiar, and that if he will follow her she will conduct him to triumphs to be won on paths never by him trod before.

Chemistry is young; her step is cautious but firm, and her progress sure. She holds the key which unlocks the mysteries of nature, and her mission is to open to the gaze of man the wonderful and varied adaptations of the earth, and air, and sea, provided for his use. In the beginning God gave man dominion over the physical world, and chemistry must explore and survey the extent, and show forth the riches of his kingdom. She does not work as the alchemist worked; she does not toil to find out in matter a quality which God never bestowed upon it. Her business is with the practicable and attainable. She learns the properties and uses of matter, and brings her acquisition as an offering to the varied pursuits of man. She opens the medicine chest of nature to the physician; she furnishes a safety lamp to the miner in his pit; she puts a mask on the face of the needle-maker, which, charged with loadstone, winnows from the air the metalic dust, destructive of his life; she enters the foundry and the workshop, the distillery and the artist's studio, the pottery and the printing room, the mint and the manufactory, and wherever she enters she brings the tribute of knowledge. But though she wanders thus on her mission of benevolence, her widest domain is in the field of husbandry.

It is not surprising that our farmers lack knowledge in agricultural chemistry. Chemistry, itself, has not lived one hundred years as a science.

Agricultural chemistry is much younger. Sir Humphrey Davy died in 1829; his lectures before the Royal Society of Agriculture in London (the first serious effort in that department of science) were delivered about fifty years ago. Organic chemistry is of still later date, and geology has only within this century taken position as a science.

Agricultural chemists themselves differ on some propositions of the highest practical importance, and they have yet before them a wide surface in nature unexplored. All human science is progressive, and the sciences of observation (of which chemistry is one) are peculiarly so. But it may be safely said, that of all sciences known to man, the

advances of chemistry have been the most rapid since she took her place in the circle of the sciences. A chemist may err—he may attempt to deduce a law from facts too limited in number or character; but his imperfect or erroneous generalization cannot long escape the scrutiny of his own or others' experiments. The conflicts of opinion now going on among the distinguished chemists of the world, in regard to some of the processes in nature connected with vegetable and animal physiology, will end in knowledge.

The practical farmer, by his carefully ascertained facts, will aid the chemist at his crucible, and the chemist will bring back to the farmer knowledge of the laws by which nature works in the field of husbandry. This knowledge is indispensable. Every farmer is in partnership with the atmosphere and the soil. Like every partnership, it is a relation of trust and confidence; and as, in every other partnership, the farmer ought to know the duties of the other members of the firm as well as his own. He should know the work assigned each of his copartners, and how they work, lest he may counteract their labors by his own; and he should also know when to rely upon them, and when not. More than all, when they call upon him for assistance he should know how to furnish it. It is not my hope to see every farmer a chemist, so skilled as to be able to analyze the constituents of a plant or the ingredients of his soil. That is not my expectation. But I trust the day will come when the constituents of every plant grown by our farmer will be known, and the ingredients of every soil on which they are grown shall be known also. My hope is, that this knowledge will be diffused and rendered familiar, so that it may be applied by every intelligent agriculturist in the State. Astronomy calculates the rise and set of the sun and moon, and the periods of eclipse; and the world appropriates the results of the astronomer. Newton discovered the law of gravitation, and men who are not philosophers realize the idea and apply it in a thousand modes of usefulness. Genius finds out the hidden power of water as a propeller on the sea and on the land, and now the locomotive and the steamer are the common engines of the world. And thus shall it be with the offerings which science shall bring to the art of husbandry.

I pass to the second proposition—is it the duty of the State to place a thorough agricultural education within the reach of her youth? and if so, how? I assume that she has not yet done it. I assume that within her boundaries all is not known that ought to be and can be known by proper appliances, to elevate the condition of agriculture —that the State has not furnished the means of acquiring this knowledge—and my purpose is to show, if I can, that she is under an obligation to make this knowledge accessible.

On Monday, the 12th day of June, 1820, the people of Missouri, in convention assembled, at St. Louis, established a "free and independent republic," and ordained a written constitution.

For the period of little more than one year, the republic, thus

formed, was in a peculiar sense "free and independent"—for while its people had passed out of their territorial form, the republic they formed was out of the Union. But I am not dealing with this peculiarity in her history. The republic established was "free and independent." Its foundation was laid in the capacity of its people for self-government; and knowledge, by the character of the structure, became its necessary support. Knowledge diffused knowledge in the people, who were recognized as the only source of power in the State, so that by the act which gave the form of government, a duty was created and imposed upon the government to instruct, to inform and enlighten the understanding, to instill into the mind principles of arts, sciences and morals.

That is education, and the implication carries it to the mind which holds the sacred deposit of power; and that is the popular mind. If the constitution ordained by the people had been silent, the form of government created a duty to educate, of perfect obligation. But the constitution is not silent; it speaks. It is not content to rely in this behalf upon even a necessary implication, but it puts down what is implied in apt and emphatic words. It gives to education a separate article, and the first words of the first section are:

"Schools and the means of education shall forever be encouraged in this State."

There is the duty which devolves upon the State, and its double origin, both sacred. There is the duty which rests upon her now, and will remain upon her so long as she remains a free State. Beyond that hour, I take no interest in her progress.

Education is to be encouraged in this State, not for a time only, but for all time. The men who framed this article had clear ideas. They looked to the past and to the future—they knew that liberty was a hard thing to get, and a still harder thing to keep, and they connected means with the end. They were not content to start with liberty and end with something else. The horizon of freedom was not bounded to their vision. They looked to no future that was not free. By a clear logic they saw that if liberty was dependent upon knowledge for a single day, it must be dependent on it forever; and, therefore, rejecting all temporary expedients, they declare the union of liberty and knowledge perpetual.

The organic law of Congress creating the territory, eight years before, had said: "As religion, morality and knowledge are necessary to good government and the happiness of man, schools and the means of education shall be encouraged;"—but the framers of our Constitution reject the preamble, and change the phrase by adding a word of perpetuity. They reject the preamble, not to weaken, but to strengthen the law. They cut off all argument—they silenced all debate about the value or object of education, for they knew that the legal effect of a preamble ofttimes narrows the law. They put education now and forever upon the footing of a duty absolute, requiring

no argument for its enforcement They left it as the plain duty of a free State, arising out of her freedom and inseparable from it.

This connection between liberty and knowledge is a legacy of the revolution. No men who have ever lived on earth saw or felt the force of this idea as did the men of the revolution—or so struggled to make it a living idea. In many ways they impressed it. It is to be seen in all their inculcations—but I cannot forbear to remind you of the mode in which one of the great actors of that age sought to transmit the thought to succeeding ages. He was not content that it should be seen in his life; it must speak from his grave—and, therefore, penning the epitaph which survives him, Thomas Jefferson wrote these words: "Author of the Declaration of American Independence and founder of the university." The chisel of the lapidary has engraven the words upon the hard and imperishable marble of his tomb, and the stone helps biography and history to carry down the truth to succeeding generations.

Education is therefore to be encouraged, encouraged by the State. The words of the Constitution are not addressed to the individual citizen either as a mandate or admonition. They are an injunction on the law making power—the General Assembly.

The duty cannot be shuffled off upon others, while faith is kept with the Constitution. Whatever individuals or societies may do, there is still an existing obligation on the State. There is no possibility of evasion; the obligation must be met. The government is built, not upon a throne or a peerage—not upon the aristocracy of blood or wealth—not upon any arbitrary or artificial distinction in man. Its foundation is mind, and the State is pledged to see that it shall be educated mind.

But is the State pledged to encourage agricultural education? By the second section of the same article of the Constitution, it is provided that the Legislature shall take measures for the improvement of such lands as have been or may hereafter be granted by the United States to this State for the support of a seminary of learning; and it is further declared by the Constitution, that the funds accruing from such lands, by rent, lease, or in any other manner, or which may be obtained from any other source for purposes aforesaid, "shall be and remain a permanent fund to support a university for the promotion of literature and of the arts and sciences." The Legislature is also in the same section pledged to "the improvement and permanent security of the funds and endowments of such institution."

Take these sections together, and you see the whole mind of the framers of the Constitution. You see what they meant by education, and who should have it. A school in every township, and the poor taught gratis; a university dedicated to literature, to arts and to sciences; funds for their support—permanent funds, out of the reach of legislative power, and never to be blended or mixed up with the revenue of the State—object and means, guarded with unusual care.

But what shall be taught—what literature, what arts, what sciences?

The letters, arts and sciences then known, or a select portion of them —or such as should rise with advancing civilization and knowledge? All of them; there are no restrictive words. The only limitation is that which arises out of the great object of instituting a free government, which is the liberty and happiness of man.

If agriculture, as an art or science, tends to elevate the character of man—to enlighten his understanding, to promote his happiness, to advance his prosperity, and to qualify him as a trustee of liberty—it is within the provision of the injunction, and must be encouraged by the State.

And who doubts that it is the precise office of agriculture to produce just such results as I have named? It is wise and provident that the pursuits of men should be diversified. I make no war upon the diversion of labor. I honor honest toil, whatever may be its vocation; and least of all would I underrate the value of what are called the liberal professions; but unmistakably, of all the avocations of man, agriculture is the noblest and most useful. In proportion to their numbers, the temples of justice are thronged by fewer agriculturists than by any other class of men. In the jails and penitentiaries they are hard to find, and the poorhouse does not number them among her tenants. These are decisive tests of the influence of vocation upon character.

As to prosperity, agriculture is the only producer. She feeds the world. The struggle of all other vocations is to get the riches she affords. They consume her products. In this eternal scramble, what one vocation gains, another loses. Take me as an illustration of the non-producers of the earth.

What I make somebody must lose. I add not an atom to the wealth of the world. If, quitting the law, I should go to California and discover a gold mine, still I would not have added one atom to the wealth of the world. Gold is not wealth—it is not value—it is only its representative. But the agriculturist creates wealth; and after his greatest gains he may lie down on his pillow and say, "I have taken nothing from any human creature; no man has lost because I have gained; nature only has suffered under my toil, and man is enriched by it." I would have him add, "What nature has suffered must be restored to her, and I will invoke science to help me to make restitution." Finally, as to the influence of occupation upon freedom. No enlightened statesman has ever doubted that agriculture is the safest keeper of the ballot box.

How shall the State "encourage" agricultural "education?" The State may encourage agriculture in many ways. This organization is one of them. It stimulates the pride of the farmer—it collects for exhibition the most favorable specimens of certain products of the farm —it begets emulation among the tillers of the soil, and what is perhaps more valuable, it leads to interchange of ideas between agriculturists, and thus tends to disseminate whatever practical knowledge is now

possessed by them. But it creates no knowledge; it does not augment information; it does not furnish agricultural education. It does not teach. You come with what ideas you have gathered in your experience, and such may become known to a greater number of persons by the interchange of thought; but the sciences auxiliary to agriculture are not here taught. You neither experiment nor investigate—you exhibit. If, in your respective districts, any successful mode of culture of a grass, a grain, or an animal has been practiced, that knowledge may well be imparted here to others, who will go back to their farms, resolved to submit to experiment what has here been communicated. The value of such ideas may thus be tested by a wider field of experiment, and every such test may help to the ultimate deduction of a law or principle—general, universal or only special.

If every farmer came here with carefully prepared statistics, showing the nature of his soil, the character of the seasons, the kind and quality of his seed, the mode of culture adopted by him, the quantity per acre of his yield, the nature of his manures, and how and when prepared, and when applied; together with the value of his land and the cost of production, embracing the wages of labor, when hired, or the value when not, etc., such statistics gathered by this association and carefully preserved, from year to year, might, in the shape of authentic facts, form a body of information, not only useful in showing the actual conditiou of our agriculture, but in leading to improvements in the art. They might be eminently serviceable to a board of agriculture as guides to investigation. They might lead to the true mode of culture when conflicting results followed the same mode of culture, or to the suggestion of such modifications as would be called for by different soils and local circumstances. But this association, in its widest operations, could not furnish agricultural education.

The State might encourage agriculture by the establishment of a board of agriculture, whose duty should be to collect and distribute all knowledge now known pertaining to the culture of the soil, or the growth of animals, aided by statistics furnished by the census, embracing a wide range of knowledge not now, by law, furnished by our census tables. It might be made their duty to examine and report the condition of the best conducted farms within the State, showing how results were reached in their culture. A commissioner of high scientific attainments might direct the action of the board.

The State may encourage agriculture by disseminating the knowledge contained in the best agricultural periodicals published within the State, or elsewhere. Their office is a useful one, richly deserving patronage and support; but, after all, the chief function of the paper is to spread what is already known. It extends the knowledge of the practical operations of individual farmers, but it does not furnish agricultural education. This society, starting under State patronage—the individual associations which are rising up in various portions of our

country—every paper and periodical specially devoted to the art of husbandry—the industral exhibitions of the world, are, each and all, movements in the right line. They speak the wants of agriculture. They indicate the strong conviction of the popular mind that the art of husbandry needs support; that the time has come when agriculture shall no longer be left to help itself—when it shall cease to be the only art, in an age of marvelous progress, left to struggle on, without the fostering aid and care of the government. But they do not furnish what agriculture needs.

Agriculture, like every other art, must be educated. We educate for the law—we educate for medicine—we educate for war, for war upon the land and war upon the sea. We educate for all arts and sciences, save that art or science which is the noblest of them all, and upon which all other arts and sciences depend. Three-fourths of our population are farmers, and will be for centuries to come, and yet there is not one institution in the United States in which a young man can acquire the important art of becoming a truly intelligent and skillful farmer.

I have indicated some of the sciences which are the necessary allies of agriculture. In some of the colleges of our country a portion of these sciences are taught—but they are not taught thoroughly, and what is worst of all, they are not taught in connection with the art of husbandry.

The round of studies crowded in a collegiate course of three or four years forbids thoroughness in any. Take chemistry as an illustration. How many practical chemists does Yale or Cambridge turn out? Has she ever graduated one agricultural chemist? Is organic chemistry taught at all? The student learns the rationale of an experiment—he does not experiment himself—he does not analyze. I would not undervalue the advantages arising from even the superficial knowledge of science acquired at these institutions. All knowledge is useful—and the graduate may be master of principles and laws, which, after application and study, may ripen into science. But with such knowledge of the natural sciences as acquired at our best seminaries of learning, can the graduate rank as a skillful farmer? Can he be regarded as a farmer at all?

Agricultural education is theory and practice blended. It is knowledge applied—applied in the daily operations of husbandry. It is science, by the hand of labor, applied to the field, to the meadow and the barnyard. The educated farmer is one who knows how to conduct his farm in conformity with the laws of nature. We have no institution at which this knowledge can be applied. Until such institution be established, let this society and kindred associations live and work. Let the agricultural editor toil on with his press—supported and cheered by the farmer—by the influence of a healthy public opinion, and, if need be, by the State—and let a part of that work and

toil be to demonstrate to the General Assembly both the necessity of such an institution and the obligation to establish it.

Our government is popular—the men who make laws are only agents. The interest of agriculture is the greatest interest; the numbers engaged in it are a majority. Let its voice be a controlling power in the State. I know that impediments will rise up to stop this scheme of benefaction. Prejudice will shake its hoary brow at it. Ignorance, venerable also for its antiquity, will smile at the thought of analyzing nature; and economy, in its Jewish garberdine, will count the cost. Knowledge has ever had enemies, and these are her hereditary foes. It would be strange, indeed, if agricultural learning should not cost. Despotism costs—monarchy costs. Thrones and diadems are costly things. Liberty costs. Our own American liberty was won at great cost—and I trust it will be maintained at every cost.

Knowledge will cost—but we are able to buy it. I hope we shall not give more for it than it is worth. But ignorance, prejudice, and parsimony are not the proper appraisers of its value.

It will be said, if agriculture needs teaching, and for teaching must have the school, the experimental farm and the college, why have they not been established heretofore? This question might be answered by putting others, embracing the history of all progress. Why is chemistry, as a science, only a century old? Why is agricultural chemistry half a century younger? Why is organic chemistry younger still? Why did not Franklin invent the telegraph? Why did the world wait for Fulton to make a steamboat? And for Gray to invent the locomotive? Why, indeed, is it that there is such a thing as progress in human affairs? The propriety or necessity of educating agriculture can never be determined by such inquiry; but it is not difficult to trace some of the causes which have led to the present neglected condition of the art of husbandry in our own country.

Bishop Berkley's celebrated prophecy as to the march of "empire," might with equal truth have been uttered of agriculture—for since the world began, empire and agriculture have traveled together, and their course has been ever toward the setting sun. The decline of Roman power began with the decline of her agriculture—and Rome fell when her luxurious population, deserting her fields, looked to distant provinces for supplies of corn. I know it has been said that the Spartans conquered the adjacent States of Greece because the soil of Sparta was too poor to produce corn. But the short-lived plunder cannot shake the eternal truth that the stability of a nation's power depends upon its soil.

Our own country, then a part of the British Empire, attracted the attention of this eminent prelate and philosopher, and its immense resources, then but dimly seen, may have inspired a prophecy, which will be remembered when his metaphysics shall be forgotten. His benevolent spirit originated a vast missionary scheme for the conversion of the red man of the wilderness, and he sailed to this country to

execute it, but after a residence of two years his policy was frustrated by the administration of Walpole. I do not think it out of place to add, as a just tribute to agriculture, that Christianity must take agriculture with her into the forest, before she can reasonably hope to subdue and convert the heart of the savage. The hoe and the plow are the true pioneers of the Bible.

The vast area of this country compared with its population, and the richness of its virgin soil, conspired to bring about a careless culture —ending in the present state of agriculture in America. Man has relied more upon the bounty of Providence than upon his own skill. West of every worn out field lay acres untouched by the hand of toil. West of every State exhausted by injudicious husbandry, lay territory in its virgin state, too tempting to the emigratory principle in man. It has been deemed less difficult to open a new farm than to improve an old one. Our population, by a law seemingly as irresistible as that which carries the waves of ocean to shore, have, from the Atlantic board, passed the Alleghanies, climbed the Rocky Mountains, and descended to the Pacific. Nothing in the world's history is like it. In 1620, the men of Plymouth Rock saw the first light of morning gild the waves of the Atlantic, and now their descendants see twilight deepen on the smooth waters of the Pacific.

A continent has, within the period of a little more than two centuries, been subdued into civilization by our people, and much the largest portion of it has been compassed since the Declaration of Independence. In this eventful period, government, laws, and institutions have arisen, the creations of American mind, which extort the admiration of the world; but the genius of our people has not, heretofore, been led by inventive necessity to study the mysteries of the production of the earth. No famine has ever swept over this, our own beautiful portion of the globe. With small toil its population has been fed, and a surplus produce has gone to supply the wants of older and more crowded nations. America has had more land than laborers, and, accordingly, we see the inventive mind of our country creating laborers out of wood and metal, and sending them to the field to do the work of men. In this department of enterprise, with the untaught study of only twenty-five years, we lead and teach the nations of the earth. And in any field of human enterprise, set but an object and a motive before the mind of America, and she will win trophies against the competition of a world.

Bounded now by two oceans, the period has arrived in the history of our country when the public mind is directed to the improvement of our present possessions, and the agricultural mind of our country, especially, to the improvement of the soil within its present boundaries. The indications are unmistakable, as they are widespread. North and South, East and West, the cry is up, "why shall not agriculture be an educated art?" Why shall not educated mind go from the halls of learning to the farm, as it goes everywhere else? How

the young mind shall be educated to fit it for the field, has not been decided. It is a great question, requiring thought and mature deliberation. It is a subject worthy of the best energies of the best minds of America. Whatever suggestions I offer, is with diffidence, but by whatever steps of progress led, it seems to me, the end must be the school, the experimental farm, and the college. I know no other mode by which science, agricultural science, can be so taught as to blend theory and practice—the highest consummation of art. In other countries important attainments have been already reached by these instrumentalities. Europe, engaged for centuries in the cultivation of the arts of war, has, since the fall of Napoleon, turned its attention to the arts of peace. In the short period of its repose, three hundred and fifty schools and colleges exclusively devoted to agricultural education have arisen, surrounded by experimental farms, upon which the sciences taught have been practically applied. Necessity, that wonderful mother of invention, has forced Europe, with its crowded population, to seize upon the first years of peace to learn how to make the earth more bountiful. Germany, France and England, within that period, have given birth to chemists of world-wide distinction, who have illustrated the power of science over the soil. Government has been wise enough to put by the side of all engaged in the culture of a plant, or the growth of an animal, the chemist who has studied the laws of vegetable and animal physiology. The man of science has been able to teach the sheep grower how to improve his wool. The testimony is uniform to this great practical test of usefulness, that wherever these institutions flourish, agriculture is most elevated as an art.

Distinguished travelers, the reports made to the patent office, and the instructive evidence furnished by Professor Hitchcock in his celebrated report on the condition of agriculture in Europe, made upon personal inspection, establishes the truth of the proposition.

The Royal Agricultural College, at Cirencester, has six professors, and seven hundred acres of land for agricultural purposes. The school at Grignon, near Paris, has also six professors—and in this school, where the education is thorough, the entire course is three years. The experimental farm attached to it contains seven hundred and fifty acres. France has at present seventy-five agricultural institutions. The present ruler of the French nation has shown —whatever else he has exhibited in his imperial sway—sagacity and wisdom in his department of agriculture. At Versailles there is a National Agronomic Institute, employing nine first class professors and three thousand six hundred and fifty acres of land. The course of instruction in France embraces a wide range of the sciences. Thus, the Grignon school teaches algebra, geometry, mechanics, surveying, leveling, stereometry (the measuring of solid bodies,) and lineal drawings, in the mathematical sciences—in the physical sciences, mineral chemistry, mineralogy, geology, and botany—organic chemistry or

agricultural technology, agricultural arboriculture, sylviculture, veterinary art, agricultural zoology and equitation, in what are denominated technological sciences and rural architecture, forest economy, farm accounts, rural economy and rural law, in the noological sciences. This institution has already graduated six hundred students. Prussia alone has three superior schools, two intermediary schools, twelve inferior schools, thirteen special schools, and two connected with colleges and universities.

They abound in the various principalities of Germany, in Italy, and the Autocrat of Russia, in his wild domains, has found it necessary to establish sixty-eight agricultural institutlons. The superior schools rank with our best colleges, in the extent and variety of the sciences studied, and the intermediary schools may compare favorably with most of our colleges. The institute established as late as 1818, by the King of Wurtemburg, has a royal domain of eight hundred and twenty-five acres, one director, six professors, besides six other functionaries charged with various labors. The instruction given is embraced in three departments. First—agricultural matters. Second—forest matters. Third—auxiliary sciences. Omitting all that relates to the forest, let us glance at what is included in the agricultural course and the sciences in aid of agriculture.

First—climate. Second—soil. Third—manures. Fourth—tools and implements of tillage. Fifth—of clearing up of ground. Sixth—of meadows and pastures. Seventh—of agriculture in general. This is divided into plowing and other tillage, seed plots, (of grain and root culture,) threshing and preservation of grain. Eighth—of special agriculture. All cultivated plants are treated of particularly. One course of studies is viticulture, embracing the culture of the vine, and wine making. Another, the culture of fruit trees. Another, the rearing of cattle—the various races, their crossing, and the treatment of their young. Another, the rearing of the horse—his natural history, the different methods of raising, the choice of animals for reproduction.

The treatment of mares and colts, another rural industry in winter, the manufacture of beet sugar, of liquid manures, etc., in summer, the manufacture of vinegar, cider, lime, and draining tiles, and the last course in agriculture embraces the whole field of rural economy; as valuation of real estate, general circumstances of the country, of farms in general, and the different parts of the same farm, of the home means of maintaining its fertility, of systems of culture, of labor and the internal organization of a farm, of the relation between the number of beasts and the land worked, of the capital of the farmer, of the different modes of working a farm, and the last, but not least, agricultural book-keeping.

I glance only at the sciences auxiliary to agriculture—higher arithmetic, algebra, trigonometry.

The science of measuring solids, applied geometry, mathematics

applied to the culture of trees and the entire forest, and their valuation; physics, mechanics, chemistry, vegetable botany and physiology, special and rural botany, zoology, veterinary medicine, the natural history of domestic animals, their anatomy, animal physiology; the care to be taken of animals, the treatment and medicine for slight diseases, the description of the diseases, pathology and therapeutics; veterinary surgery, the internal diseases of animals and murrains; rural constructions, preparing plans and drawings of machines.

To illustrate these courses of instruction, the means are ample. Among them, the operations on a large farm, annexed to the institute, a forest of five thousand acres, a botanic garden, a library, a geological and mineralogical collection, a collection of woods, seeds and resins from the forest, a collection in comparative anatomy, and a collection of specimens of wool; specimens of agricultural products; models of instruments of tillage, models for physical science, and collections for chemistry and the laboratory.

I should weary you by any further detail of the system of instruction established at the most celebrated of the agricultural colleges of Europe. They form an interesting study for the statesman and the man of science, when he comes to the model which shall be adopted in our own country.

The question has been vexed in Europe, as to the manner of teaching the youth who devotes himself to the business of husbandry. In Prussia, and in many parts of Germany, they begin with the practice and end with theory. The student is made familiar with all the manipulations of husbandry, before he masters the science which directs them. Perhaps you will pardon me if I bring before you a nearer view of the working results of these institutions.

At Breslau, in Prussian Silesia, in September, 1845, a meeting of German agriculturists was held, numbering about one thousand members. Several sovereigns were present by deputies—the agricultural societies were represented by their ablest members, and the most distinguished scientific professors of agricultural institutions formed a constituent part of the assembly. After a speech from the president of the body, on the condition of agriculture in Silesia, the organization of six committees, to report upon six subjects, to wit: 1. Agriculture proper. 2. Raising stock. 3. Culture of the forest. 4. Technical branches. 5. Fruit and vine culture. 6. Wool growing.

The examination of sixteen students came off—students who had been instructed in various agricultural institutions of Prussia and Germany. These young gentlemen were seeking to become qualified to conduct the operations of baronial estates. The eldest was twenty-three, and the youngest sixteen years of age.

After answering various questions in writing, connected with their studies, they were taken to an estate called Rosendale, near Breslau. In the yard the pupils were shown a wagon, marked in thirty-six parts —a plow in thirty-five parts—a hacken, (a sort of cultivator,) in five

parts—a harrow in six parts—making altogether, eighty-two separate parts. Each pupil had to put down on paper the name of each part, to show whether he was acquainted with all the parts of the different implements, and in case of breakage, to mention the most efficient mode and means of repairing.

A sheep was then brought forward, and they were required to put down on paper the answers to the following questions: 1st. Is this sheep healthy, and why? 2d. How old is this sheep? 3d. What is his age in shepherd language? Each pupil was next required to catch a sheep himself and examine it, and report whether it was diseased, and the signs of the disease. They were also to point out upon a sheep the places where the worst wool grows, and on which the best, and likewise to designate the places where the faults of wool are most liable to be inherited. Several head of cattle were now brought before them, and the following questions propounded:

1. How much milk can a cow of this breed give, when fed with grass or other green fodder? and how long since she had a calf?

2. How many pounds of fodder does a cow of this breed require per day, during summer; how much during winter, and the cost?

3. How many calves has this cow had? and how old is this cow?

4. What breed is it, and why do you say so?

5. How much will she weigh of meat? how much of tallow?

They were then examined upon horses. The horses being first inspected by the pupils, the following questions were required to be answered: 1. What are the peculiar qualities of this horse as a plow horse? 2. Which of these qualities are requisite for a good plow horse, and which are not? 3. How old is this horse? 4. Several places were designated on the horse, and the pupils were required to tell what diseases affected this or that part, and the remedy. 5. The anatomy of the horse, and the hoof especially, became the subject of examination.

The pupils were then conducted to the barns, where they had to show their skill in making straw bands, in cleaning grain and in sowing grain, etc. Afterwards they were taken to the fields—first to one of light soil, and then to one of heavy soil, and the following questions were put to them: 1. What is the name of this kind of soil? 2. What are the names of the principal parts of which this soil is composed? 3. What is the name of the sub-soil, and is the sub-soil retentive or not? 4. What kind of crop succeeds best on this kind of soil? 5. How large would you make the beds on such soil, and why? 6. Is this soil heavy or light, cold or warm? These and similar questions were asked of the soil at different spots. They were then asked, in writing, the following questions: 1. In the case of a heavy soil sown with wheat and oats, and in that of a light soil sown with rye—state for every month how much plowing and harrowing has to be done, and with how many horses or oxen? How much manure will you require, expressed in loads? Do you call that light or heavy manuring? How will you treat the manure in the stable, in the dunghill, and in

the field? When you have at command drainings of your ordure pile and mineral manure, how and for what crops would you use them? What kind of weeds appear in the summer crop? What in the winter? —and how would you destroy them? How keep them from coming up? If you have good and bad meadows, to what kind of cattle will you give your best, and which the worse kind of hay?

In the department of economy—involving the relation between the various kinds of labor to be performed and the force necessary to its accomplishment, the examination was conducted with great rigor. It embraced the preservation of every crop, and the distribution of the labor as well as its amount. So also the subjects of drainage and ditching, and other farming operations in their minutest detail, were put to the pupils with rigid severity. The examination closed with the important theme of agricultural book-keeping—showing the entire operations of a farm—the relative distribution of forces—and the cost of food consumed by each animal—and the wages of labor.

I give you the collected mind of this august assembly of agriculturists, in the form of four propositions reported by committees and adopted by the meeting:

1. Educate the masses for their pursuits in after life.

2. In regard to agricultural education—the practical must be thorough.

3. In theory, all high scientific speculation should be avoided, and its application to practice alone be taught.

4. To establish boards of examination over all Germany, with proper examiners for every district.

Under such maxims the educated agriculturist will not be apt to run wild upon beautiful but visionary fancies. Theory is tested by the true touchstone of truth—the capability of being reduced to practice. I trust we shall ever avoid the Sangrados of science. There is no universal sovereign specific for the cure of sick soils. Above all other pursuits, agriculture demands the co-operation of knowledge and ability—theoretic acquaintance and practical skill, insight and outsight.

I would have my country profit by the wholesome lessons of all countries, but just distinctions must be made, arising out of difference of circumstances. The course of instruction suited to Europe will require modification here. We must adopt its agricultural learning, as we adopt the common law of England, only so far as it is suited to the nature of our institutions and local condition. Light, heat and moisture, climate and seasons are important agents, greatly modifying in different localities the processes of nature. The education for America must be American.

Who shall teach? will be the inquiry of adversaries. The question is pertinent and the objection plausible. Who shall teach? The answer is two-fold. Our institutions of learning in the beginning were conducted by European mind. In founding the University of

Virginia, Mr. Jefferson relied upon Europe for professors in several important branches of science. But I take high ground. Mind, like commerce, obeys the law of demand and supply. Create a demand for intellect in any walk of human enterprise, and it will be supplied. I feel my breast swelling with the proud thought, that the intellect of my country will honor every draft that may be made upon it, under whatever exigency of progress.

In England the pride of birth impairs the usefulness of her best agricultural college. The sons of noblemen will not work, save by the side of their peers. The young sprigs of nobility lose caste if seen toiling by the side of a youth whose father never wore a star or garter! What artificial things aristocracy makes of men. Will the day never come when ribbons shall cease to dwarf man? When the now impassable barriers of caste shall be broken down or perish piecemeal, by that law of decay which attaches to all things immature? When human progress shall no more be arrested or impeded by the conventionalisms of rank, creating distinctions in man, which the vision of his Creator is not sharp enough to see?

If there be, within the sound of my voice, one father whose parental pride is seeking to gratify itself by placing his son in a position above the rank of farmer—if there be here one Madame Deschapelles, who sighs to wed her daughter to a title—one beautiful, proud Pauline, who yearns to glitter as the bride of nobility, to that father I say, you have forgotten the lessons of the father of your country; to that matron, you will never be the mother of a great American statesman; to Pauline, true nobility in man is never found above the dignity of labor.

And if there be in our State one youth of promise, who feels within his breast aspirations kindled by the pride of intellect, who wishes to make his mark upon his age and generation, who scorns to be ignorant, and would rise to knowledge, but would avoid the fields as not being the path that leads to fame, I have some special words for him. Young man, what do you aim at? What model of excellence is in your mind? To what country and what age do you look for an example? Are you fascinated by the deceptive halo which antiquity throws upon the men and deeds of remote ages? Then go to Rome, in her purest, palmiest days—when to be a good citizen was to be a good farmer—when to be a skillful agriculturist was the highest distinction of a Roman citizen—when unskillfulness in farming was visited by the rebuke of the censors. Study the names of such Romans of that period as history makes immortal, and you will find that they come down to us, not by the names given to them at birth, but by titles derived from the plants and grains brought to greatest perfection under the culture of their own hands. In that school of virtue and true glory you will find that history had a holier office than to record the intrigues and battles of ambition. Or, if willing to take a model from the short but glorious career of your own country, look at the names which

make a part of our national property. Of all the men who have shed luster upon our annals, how few can you number who were not farmers!

Be assured, there is not an error more mischievous to start with in life—not one apter to mar the usefulness you aim at, than the mistake of supposing any incompatibility between husbandry and greatness. Statesmanship, which opens to noble ambition the widest paths of honorable fame, is only farming on a large scale.

Are you captivated by the exhibition of intellect in its highest reach, winning loftiest honors at the bar and in the Senate? Contemplate the life and death of Daniel Webster. See how his mind acquired strength of fibre in his farm life amidst the hills of New Hampshire; watch it in the acquisition of knowledge at college; its earliest triumphs at the bar; pursue it to the Senate chamber, the scene of its matured splendor; follow it in the quiet shades of Marshfield, and everywhere you will behold its unbroken allegiance to the soil. In the last days of his life, what brings him from the sick chamber to the porch, to look for the last time upon a scene lit up "by the sun in heaven?" Upon what does his "last lingering glance" fix itself? The ocean is at his feet; he hears its murmurs, and the sea breath fans his whitened locks; perhaps his soul, seeking sympathy with its own elements of grandeur, gazes on what in nature was the type of its depth and power? No, no. It is not that. His deeply poetical nature turns from the contemplation of mere physical nature in her sublimest aspect, and seeks the "utterances of life" in pastoral simplicity. He turns from the sea. His eyes are on the fields enriched by his culture; on the lowing herds who miss the hand that fed them. In that moment, whatever are his other aspects, he stood revealed to us and to the world as the farmer of Marshfield.

Mr. President, we live in a remarkable age. The human mind, starting out in new paths of inquiry, has established a new dominion over the physical world. On the sea and on the land, time and space, the old foes of progress, are nearly conquered—conquered by science. Once they were despots, but now reasonable rulers, confined within certain well defined limits of power. The spirit of progress demands yet further restrictions. See how science has laid her hand upon the sea. Commerce once crept from headland to headland in timid crafts. Science gave her the compass, and she went from shore to shore. Naval architecture then became underwriter for the safety of cargo and crew. The mad waves which once severed nation from nation science turned into the theater of national contests in peace and in war, and weary of the laggard and fickle motion of the winds, she seized the invisible strength of water, put it into iron harness, and defied both wind and wave. She made "her home upon the deep," but her greater triumphs are on the land. The locomotive is swifter than the steamship. By their united power oceans dry up, continents shake hands, and Ariel's girdle belts the earth. Men are made of wood, and

metal and stone—swift men—strong men—enduring men—who live and work, without food, without sleep and on small pay. But amidst all this marvel of progress, which changes the commerce and character of the world, puts new ideas in the heads of statesmen and reverses the policy of cabinets, how little has been accomplished by science to augment the productive power of nature. She has been treated as if the principle of decay could never touch her bosom, nor the process of exhaustion diminish its supply. Agriculture is the only art left behind in this unparalleled advance of all other arts and sciences. Is this neglect a necessity or an oversight? That is the great question for solution. Let the agricultural mind of Missouri determine it.

The earth belongs not to those who now live on it. It is an estate in perpetuity. We are the tenants of this age, and there are countless ages of remainder-men. Responsibility to God and man rests upon all who injure or destroy the fee.

GENERAL MINOR'S ADDRESS.

OFFICE MISSOURI STATE AGRICULTURAL SOCIETY,
BOONVILLE, October 4, 1854.

General James L. Minor:

DEAR SIR: At a meeting of the Board of Directors of the Missouri State Agricultural Society, held upon the fair grounds this day, Colonel Thomas C. Anderson, of Callaway county, offered the following resolution:

Resolved, That the Board of Directors of the Missouri State Agricultural Society have listened with attention and profit to the able and appropriate address delivered this day by James L. Minor, of Cole, and we express the confident expectation that its exhibition of facts and cogent reasoning will impart new zeal to the cause of agriculture, mechanic arts and domestic industry, and respectfully request a copy of the same for publication.

Which was unanimously adopted.

In making this communication, allow me to express the desire that it may suit your pleasure to comply with the request of the directory.

I am, very respectfully, your obedient servant,

JO. L. STEPHENS, *Recording Secretary.*

BOONVILLE, October 4, 1854.

To J. L. Stephens, Esq., Secretary Missouri State Agricultural Society:

DEAR SIR: The address solicited for publication is at the service of the society.

If it shall have any tendency to elevate agriculture to the high place it merits in the opinions of our citizens; if it shall contribute to any improvement in our methods of culture; if it shall awaken our farmers to a sense of the importance of preserving the fertility of our soils, I shall never regret its publication.

Please tender to the society my thanks for the complimentary terms of the resolution.

I am, very respectfully,

JAS. L. MINOR.

Mr. President and Gentlemen of the Agricultural Society:

Another one of our annual festivals is upon us, and we have assembled again to pay the tribute of our affection and the homage of our respect to the blessed mother of all the arts. We have come with an elevated feeling to her temple, where sectional differences, party zeal and personal animosities find no entrance, and where, as I hope it will ever be, a spirit of generous rivalry is the presiding genius of its rites. We come here to-day heralded by no pomp and pride and circumstance of glorious war. No roar of artillery nor military pageant announces our assemblage, as one connected with the fierce passions of the human heart; but we bring with us here the quiet asurance of the strength and nobility of that great cause that must ever be the source of all our prosperity, and the steadiest and surest support of our national freedom.

It must be a source of congratulation to every true farmer among us, as he casts his eye over this assemblage, to witness the continued interest manifested in the welfare of our society. To promote true agricultural energy and knowledge, I know of no method so effectual as an association like this, which to us is a great Lancastrian school, where all alike are teachers and scholars, where farmers meet on common ground, and where interchange of opinion, result of experiment, comparison of product and of different modes of culture are the subjects of free and unrestrained conversation.

But while this is a source of congratulation, I regret that we meet to-day under circumstances not so auspicious as those which greeted our last meeting. Providence, in its wisdom, has withheld from us the showers that are necessary for the ripening of some of our crops, and a panic, that I hope is groundless, has spread over the land as to the prospect of food. While some of the earlier crops, such as wheat and oats, have matured with perhaps an average yield, the corn crop of the country has suffered beyond any former experience. If this calamity should teach us more economy in the use of our grain; if it should introduce among us a system of culture that would enable our lands to withstand drouths; if it should teach us the best and cheapest modes of feeding and sheltering stock, and if it should teach us, beside, the necessity of a greater reliance on Him who holds in His hand the rain and the sunshine, the blast and the mildew, then this misfor-

tune, which seems so general in our State, and which has excited more uneasiness than all the political, religious and social distractions of the Union, will really prove to us a blessing in disguise.

We belong, Mr. President, to an institution the oldest on record. The first born of the earth were farmers; and yet, while all confess their dependence on the labors of the husbandman, it is a little singular that for a period of nearly six thousand years, with the exception of a bright interval during the Greek and Roman republics, agriculture has been regarded as the occupation of the servile and the menial as a following (for it was not dignified with the name of art), that justified no experiment for improvement, and which, in consequence, entitled its humble followers to nothing else than mediocrity in fortune and exclusion from fame. The world has always been more captivated by the splendid than the useful. The triumphal processions of consuls and kings, and emperors and sultans, have descended to us in history, while the plow that sent forth its elements of strength to achieve their conquests is lost sight of in the glitter of the pageant; and not only have the tillers of the soil been subjected to this oblivion, but they have been compelled to submit to the injustice that makes synonymous in significance the ancient epithets of the art with those that betoken rudeness and wickedness. The terms villain, hind, clown, boor, etc., have been borrowed from agriculture to express the extreme of degredation and vice—a strange and unaccountable perversion of language that can create an identity of feeling between that art which, by constant intercourse with the works of the Creator, elevates and purifies the heart and the human pursuits and human passions that lead to brutality or degenerate into crime.

Nor has our beloved art ever been, to any very great extent, the recipient of political favor. Governments have forgotten, in their awards, the very elements of their strength. The farmer who, by his successful labor, has supplied the resources of his rulers, has very rarely been selected to guide the helm of empire, in consequence of that wildest of fallacies, so prevalent even in this day of intelligence, that one part of mankind must do the thinking and the other part the working operations of life. Cincinnatus and Regulus and Gideon, Scipio and Cato and Washington, are bright refutations of this error that denies to agriculture the exercise of thought, the abilities of the statesman or the emotions of the patriot.

War has been to our institution its most unrelenting enemy. With its constant drain of men for the supply of its armies, with its ruthless despoliation of the resources of husbandry, with its indiscriminate destruction of the causes of rural wealth, it has entailed upon agriculture curses equally baneful in the demoralization of whole communities, in increased taxation upon labor, and the habits of prodigality that so often follow to his home the disbanded soldier, and that utterly unfit him for the active and successful culture of the soil.

Peace has been to agriculture the day of its greatest triumphs. The

hand that closed the temple of Janus has always opened that of Ceres. The return to industrious habits and the consequent security of property, which always happen when men become tired of butchering each other, and the voracious appetite of ambition is sated with blood, form the periods of agriculture's great success. The world, since the downfall of Napoleon, has enjoyed, until recently, an interval of unexampled peace; and in this period the locomotive, the daguerreotype and the magnetic telegraph have been added to the world's stores of usefulness, while agriculture has advanced under the same fostering influence, to a degree of improvement that has never occurred to it in any former period of its existence.

And in gratitude, when agriculture rises—as it must rise, like some huge Titan, heaving and convulsing the mountains that ignorance and folly and oppression have heaped upon it—one of its best and earliest fruits will be to command general peace to the earth, to convert the sword into the plowshare, and to divert the fierce and angry passions of men into channels of individual wealth and national greatness.

I have said that our great art is progressive. It is eminently so. It is moving with the stride and step of a giant. Chemistry, its youngest and best beloved daughter, is bringing its rich gifts with wild profusion and filial fondness. Science and learning now find their noblest fields of operation in the materials that they draw from the earth, and the elements of fertility they return to her bosom. The arts acknowledge her as their bounteous mother; and a beautiful connection of mutual dependence and support is established between the science of agriculture and the kindred sciences of the earth.

But while this is the present condition of husbandry, it becomes a matter of prime necessity that we should be prepared to take advantage of its progress. The farmers of the country must keep pace with its agricultural improvement. The day is fast approaching when we must be educated for our great occupation, and when training very different and far superior to that now learned by the ordinary modes of seed time and harvest, must be acquired by the tiller of the soil if he expects to realize constant profit from his labors. We must learn to avail ourselves of the science that is now so busy in making agriculture the first and most profitable of human pursuits. We must learn of what our soil consists, what it needs, and in what it superabounds, what is the proper rotation to preserve its fertility, what modes of culture to adopt, how to preserve and apply our manures, how to feed and rear cattle to the best advantage, how to rectify the abuses of injudicious cultivation, and, in a word, how to achieve the greatest results with the least expense.

If we in Missouri, with our great advantages, fail to learn these things, we shall soon be left behind in the great march of agricultural improvement, and we shall resemble the snags that remain fixed and stationary in the bed of the noble river that flows at our feet, while the current is bearing onward upon its bosom a commerce as mighty

as its own volume of waters, and as unbounded as its own ceaseless flow.

We must remember that we already live in the Far West, and cannot emigrate to more fertile regions when we have reduced our lands to a condition that will no longer support us. By that time California will be full, Texas settled, New Mexico replete with all the population it can sustain, Kansas and Nebraska teeming with their complement of inhabitants, and we shall be compelled, by sheer necessity, to sit down quietly on our own farms, and feed our lands that they may feed us. Fortunately for us, our soil is a good one, and still more fortunately, we shall, sooner or later, be driven to methods of culture and habits of economy that will decrease our labors, while they will increase our wealth.

To enable us to do these things, we all must call in the aid of science. Let me here not be misunderstood: by science I do not mean the process of abstract calculation and costly experiment; I do not mean the knowledge that requires a lifetime of laborious study, or the highest efforts of the human intellect, but I mean the knowledge of facts that are equally accessible and beneficial to all. I do not mean that every farmer must become, by means of close closet study, a man of science; but I mean this, that he must learn to avail himself of the science of others. As an illustration, we do this daily in the use of domestic and agricultural implements that science, laborious science, has perfected for our use.

To some extent the farmers, as a class, are scientific men. They work by the same laws that govern the chemist and even nature herself. They know the effects on their grain of the rain and the dew, the frost and the heat, as well as the philosopher, who is often obliged, before any of his deductions can be fixed, to avail himself of the experiments of the tillers of the soil.

But there are some things that we cannot learn by our own observation. We cannot tell, for instance, what elements of fertility our soil has or lacks, what portions of it our crops exhaust, and what we must apply to it to restore its virgin freshness. It is true we can find out these things by a series of constant experiments, but these experiments must of necessity be slow and expensive. Would it not be cheaper and better to take up a handful of earth, and say to the chemist: "Here, sir, is a portion of my farm. I cannot produce from it crops that will pay me for my labor. Can you tell me, sir, what it lacks, and how I shall supply it?" The answer will be prompt and satisfactory, "I can." And the result of his advice—if the chemist is skillful—will be a crop of double quantity.

If I am met here by the objection that a chemist is not always convenient, nor the manures he recommends accessible, I will answer, that, in a few years, the first plain principles of agricultural chemistry will be understood by nearly every intelligent farmer in Missouri, and

that the diffusion of this important information will be an object of State pride, as its geology is at present.

In answer to the second objection, that the manures may not always be convenient, I will reply by the broad assertion, that in, beneath and below every arable soil upon the globe, nature has planted the exhaustless sources of perpetual fertility, and that the same causes that originally gave to the soil its productiveness, will work on forever in an unbroken and beautiful chain of exhaustion and supply. These processes are made for use, and it is a part of God's providence that, sooner or later, we shall be compelled to use them.

It is not for me, a young farmer, to cast reproach upon the farmers of my State, but I am confident that it has occurred to the observation of nearly all who hear me to-day, that many of us cultivate our lands as if we believed that their natural fertility could never be exhausted. Let me assure you that there is no error so fatal to agriculture as this. It has been the bane of every country that was once fertile, but is fertile no longer; and I do earnestly trust, and I believe it, too, that the increasing light our labors shall derive from science will check, to a great extent, and before the remedy becomes necessary, this great waste of one of God's noblest blessings.

Agricultural chemistry has taught us that the earth is composed of elements that enter, in various proportions, into the composition of different plants, and that if any soil lacks any one, essential to the growth of a plant, it will not mature there. It has taught us, also, that plants abstract from the earth many of the elements of fertility, and that it will be necessary to restore them before the soil is capable of producing the same crop; and it teaches us, also, that some plants deposit an excrement from their roots—that while, perhaps, beneficial to other crops, will be certainly fatal to the original plant, if cultivated in direct succession and without the application of some corrective.

These simple truths, that now startle us with their new name of agricultural chemistry, we all knew to some extent before, and by their proper application we must expect to preserve the original freshness of our virgin soils.

In illustration of these simple facts, I will read one or two of the many recorded instances.

FIRST EXPERIMENT.

Mr. Reverdy Johnson, says the *American Farmer*, purchased, in 1848, a small farm near Baltimore, in the last stages of impoverishment. Such was its reduced condition that the last crop of corn was not more than a peck to the acre. He states that all the vegetable matter growing on two hundred acres of cleared land, including briers, sassafras and other bushes, if carefully collected, would have been insufficient for the manufacture of one four-horse load of manure. He

applied to Dr. David Stewart, of Baltimore, an able chemist, who rode out to the land and procured specimens of the farm, which he carefully analyzed. He found that it contained an abundance of lime, potash, magnesia, iron and organic matter, duly mixed with alumina and sand; one element only of fertile soil was wanting—phosphoric acid—and of this there was no trace. He commenced an application to the soil of biphosphorate of lime, a preparation of bones, as the best mode of supplying the deficient element. The remedy was given at an expense of ten dollars per acre. It was the one thing needful—health was restored to the exhausted patient, and the grateful soil yielded, last year, twenty-nine bushels of wheat to the acre. Nothing else was applied—indeed, nothing else was wanting. Here was a beautiful triumph of science. There is no doubt of the facts. The experiment came under the observation and attracted the attention of hundreds. It was detailed by Mr. Johnson himself, and various others worthy of perfect reliance.

SECOND EXPERIMENT.

If a cabbage be suddenly pulled from the ground, and the dirt washed from the surface of its stem, and then be plunged in a jar of chemically pure water, the following phenomena will take place: After a short time the water will become milky, and, in a few hours, several flocculent particles will be seen to descend to the bottom, until, if the cabbage be of ordinary size, and the jar six inches in diameter, a deposit of one inch depth of semi starch-like consistency will occur. If this be poured around the roots of another cabbage, it will kill it; if poured around a beet, a carrot or a parsnip, it will materially increase its growth. Thus it will be seen that the excrementitious matter of one plant is food to another; and hence the necessity for a rotation of crops, a plant not being able to grow in the presence of an excess of material unfriendly to or not required by its organization.

Some crops do not throw off excrementitious matter. Thus, the onion beds of Wethersfield have, in some instances, been grown on the same soil for a hundred successive years. And this, I suppose, is the case with the hemp crop.

Now, it appears from these facts that the earth must be fed to enable it to feed us. It must be supplied with food, as our animals are supplied, if we look to it to reward our efforts, and to render profitable the labor of our hands. I believe it is a conceded fact among farmers, that no well tilled soil can be exhausted, and that the soil can be cultivated each successive year with profit, by a judicious rotation of crops. The earth is a beneficient mother, and never fails to make bounteous returns for all the well-directed efforts of the sons of labor. The converse of the proposition is equally true. Ill-directed and injudicious cultivation, forcing from the soil successive crops of the same grain, and from which the aliment necessary for their support

has already been exhausted, taking from the earth by close grazing the remnant of the crop, and the plants and grasses that nature, in her recuperative energies, causes to spring up and retard exhaustion and preserve fertility, will soon force the farmer to abandon his system or abandon his home.

I rarely see one of these ill-cultivated fields, covered with a rank profusion of weeds, impeding the farmer's efforts, that I do not feel like making to the owner the same address made by a certain captain to his men, on the eve of battle: "Men, there is the enemy; if you don't kill them, they'll kill you."

We have in Missouri, generally, a soil that will bear a great deal of improper tillage, and which is easily restored to fertility, for the reason that the sub-soil is of clay. Of all the sub-strata, gravel, sand or clay, the last is the best, on account of its great powers of absorption and retention. As a simple illustration of the qualities in this respect of these soils, I will refer to an experiment that anybody can try:

Fill three jars (common green bottles, without a bottom, reversed, will answer, first placing a piece of thin cloth over the hole of the neck) within an inch of the top with soils, containing, the first about one-sixth part of clay and five-sixths of clean sand, well mixed; second one about one-third charcoal and two-thirds clean sand, and fill the third one with clean sand; then fill up all these with the drainings from the manure heap. The liquor through the pure sand will come out nearly as it went in; the other two will have left much of their color and all their smell with the charcoal and clay which have absorbed them.

And it is seriously recommended to the farmers of Massachusetts to haul clay as a fertilizing compound to their sandy and stony lands. Here we have no such need, for our sub-soil is of clay, and we can bring to our surface, by deep plowing, this element of fertility. As a further evidence of the fertilizing properties of clay, I need only call to your recollection what every one of us has observed, that clay taken from a well or pit and spread over the surrounding earth, is sure to produce a crop of great luxuriance, deep color and abundant grain.

But because we have this fertilizing sub-stratum, we must not fold our hands and say, "Our lands need no manure—they are rich enough without it—we have beneath us the elements of perpetual fertility. If we acted thus, we should soon learn to our cost, and some of us have learned it already, that there is a wide difference between having a valuable sub-stratum, and making its valuable qualities available—as much difference as between the block of marble and the exquisite statue that only labor and skill can produce from it; as much difference as exists between the rough ore upon our hills and the locomotive that science extracts from it. No, we must avail ourselves of the means science (or, if you prefer it, experimental knowledge) has pointed out.

One of the most important and successful of these means is a system of deep plowing.

We all remember the story that we read in childhood of the dying farmer, who told his sons that there was concealed in the field a great treasure, and they must dig to find it. Taking the old man's word literally, they dug the whole field over without finding the object of their search; but, in looking back over the extent of their labors, they were surprised to see an unusual amount of vegetation in the track of their work; and they very wisely concluded that, by the treasure, their father meant the rewards of industrious labor. In inculcating this moral, the fable unconsciously taught the equally great truth of the merits of a deep and thorough stirring of the soil.

The effect of all plowing, whether light or deep, is to "admit air and moisture to the soil, and to permit the roots to travel to a greater depth by loosening the particles of earth." Admitting this, is it not evident that the deeper we plow the more air and moisture are introduced into the ground, the greater number of particles are loosened, and consequently the effect must be greater?

There is a great deal of wisdom in the practice of the old farmer who followed the rule to sow turnips on the 25th of July, wet or dry. But, it was objected to him, if there should be no moisture in the ground? "I'll plow until I raise moisture!" And this is not so difficult an operation as one would suppose.

It is well known that when cold surfaces are exposed to the atmosphere, on a warm day, drops of water will gather on them, by the process of condensation. You have all observed a pitcher of ice water, even on the hotest days of summer, covered with drops, which are produced by the condensation of the moisture of the atmosphere upon a cold surface. Now this same principle, when applied to deep plowing, produces its most important results. By turning up a deep soil you present a cold surface to the air, and the moisture not only condenses upon the surface itself, but by pulverizing you increase this process, and enable the atmosphere to circulate among the particles below, which are thus made the continual recipients of the moisture from above. We all know the value of moisture to the soil. The lamentable experience of this year's drouth will give to this opinion a painful conviction of its truth. Another good result of deep plowing is the burying to a greater depth the noxious weeds that impede the farmer's progress through his fields, thereby insuring a greater amount of manure in the shape of matter that thus becomes decarbonized. Nor does the farmer lose anything in the amount of actual work expended, for where he plows his lands deep, he will find his subsequent labors lessened, and his teams less harrassed, on account of the previous pulverization of the soil.

Another error against which we must guard, is the cultivation of too much land. This is an evil which, in the West, it will take a long time to eradicate. The vast extent and cheapness of our arable lands—

the insane desire of adding acre after acre to our possessions, and the constant practice, induced by superficial and improper tillage, of bringing new fields annually under the plow, and the necessity for a superabundance to supply our wasteful methods of gathering and feeding, will, I am afraid, make my words of caution on this subject a labor of love. It will take something stronger and sterner than advice to correct this evil. If it is possible to convince you that you can make two blades of grass grow where only one grew before, it would be easy to convince you that, as a matter of course, one-half of the land would produce the same result. He is not the best farmer, in my opinion, who cultivates the greatest extent of land, but he is the best who does these things with the least expense.

I read once a pretty story of a Sicilian peasant that had three daughters. When the eldest was married, he gave her one-fourth of his vineyard, and his annual crop after that was the same. When his second daughter married, he gave her one-fourth, and still his remaining vines bore the same quantity of clusters as before. When the third daughter married and received her equal portion, his harvest was as large as ever. The secret lay in the fact that he bestowed on one-fourth part the same skill and labor formerly expended on the whole vineyard, and with the same result.

In a trial recently had in Kentucky, there were nine competitors for the premium corn crop of that State, each of whom cultivated ten acres. The average crop was one hundred and twenty-one bushels and twenty-four quarts to the acre, (or, to count by Western measure, twenty-four barrels,) while the highest was one hundred and eighty-nine bushels and one quart—more than thirty-seven barrels. Now, it may be objected that these farmers devoted all their time and labor to these ten acres. On that point the record is silent. Even if they did, the farmer who raised the largest amount gathered, from his ten acres, three hundred and eighty barrels—more, in all probability, than he needed, and more than is made by ordinary cultivation from forty-five or fifty acres, and with less labor, no doubt, than is bestowed on this last mentioned quantity of land.

But cost his experiment what it may, it was invaluable, because it showed the capacity of the soil, the effect of proper cultivation upon it and the policy of cultivating less land. If such an experiment shall teach our farmers a system of culture that will add only one bushel more to the acre, it will be cheaply purchased by the sacrifice of the labor of a score of years, for it will add millions to the general wealth.

While the system of cultivating less land will not only add to individual comfort and prosperity, it will also place in a state of rest many of our fields that already require repose, and thus enable them to re cover from the atmosphere and the earth the lost elements of their fertility.

As to the other means of successful farming, such as the selection of good seed, early culture, the extirpation of weeds, etc., these so

naturally suggest themselves to every farmer that they need only this passing notice.

There is, however, one essential element of success that I cannot pass over in silence. It is the use of the best agricultural implements that can be procured. And of these, first in rank, foremost in utility, unsurpassed in its results, and most important in its action, is the all-glorious plow. Blessed be the memory of the man who invented this great implement of agriculture. His name, unfortunately, is lost in the unfathomable abyss of antiquity. If known, it would deserve to be inscribed on a monument of the world's gratitude higher than obelisk or pyramid. As we cannot honor the inventor, let us give honor to the invention.

As I have not language to do justice to the value of the plow, I must use for the present the eulogy pronounced on it by a chief of one of the South Sea Islands: A missionary had arrived there, and with a knowledge of its great value as the aid and pioneer of Christianity, had carried with him a plow, and also a yoke of oxen. The chief and a large crowd of his followers had assembled to witness its first operation in doing the service that there, as in all savage countries, was done by the females. After the plow had progressed for some distance, turning and pulverizing its neat furrow, the chief could contain himself no longer, but jumping up, he clapped his hands and exclaimed, "Why, it's equal to forty women!" Now, I value my peace in this community too highly to say that any plow ever was or could be invented that would equal forty American ladies; but this I will say, that if that chief was here to-day, after casting his eyes over this bright assemblage, he would admit the impression was the same, chastened and softened, however, by the blended influence over his mind of the useful and the beautiful.

It is a singular fact, that this instrument, though confessedly the most useful of all, should have received so little attention, and been, until lately, the subject of such scanty improvement. That it was an improvement whose usefulness was suggested to every mind, is apparent from the fact that nearly every nation, civilized or savage, used it. The Indians of the sea-coast used for this purpose the bones of fish, and the Indians of the interior the shoulder blades of the animals they had slain in the chase. Yet, the same plow that was used in Virgil's time, is now used in many parts of Europe, in Mexico and South America; and it is a fact, almost too startling for credit, that it is only about eighty years ago that iron plowshares were first invented. The plow, previous to that period, was generally a forked stick of timber sharpened, to which were attached handles and a beam. The effect was only to stir the soil, not to turn it.

The modern improvements made on this implement have been marked by extent, application and variety. For one of these, we are mainly indebted to one of our greatest statesmen, philosophers and patriots, whom all men now delight to honor, and whose name is insep-

arably connected with the achievement of our liberties. I allude to Thomas Jefferson. "More than fifty years ago he was intensely occupied in contriving a mold-board of the least resistance, the benefit of which is too well known to every farmer, and I have the authority of a French standard work of the highest reputation for saying, that Jefferson was the first who ever gave any formula by which the proper curve could be given to this important part of the plow, and thus established a fixed rule for what was before a matter of mere imitation—I had almost said of mere accident."

The extent to which the improvement of the plow has been carried since the invention of the iron plowshare may be known from the fact that, before that period, the plowman could disturb but one-twentieth of the weight of soil that may now be disturbed, or, in other words, a modern plow can do more than five times the work of a plow before the substitution of iron for wood; and as improvements go on, this disproportion in favor of our plow must be greatly increased. If our mechanics can succeed in combining in proper proportion in our plows economy of material, perfection of shape, greatest possible ease of draft, consistent with a due performance of their powers, they will have given to the world its brightest boon, and laid upon agriculture a debt it can never repay.

But the plow is not the only implement that claims our attention. The reaper comes to our aid, with its life-like movements, at a time when every hour lost by the farmer endangers his crop. The corn crusher, the straw cutter, and the thresher, the wheat fan, the horse rake, and the plantation mill, are all at hand here, to supply man with power, obedient to his will and ready at his call.

With these appliances around us, a fertile soil beneath us, and a genial climate above us, I scarce know a limit to the productive energies of well-directed agriculture.

"Oh fortunati, sua si bona norint."

But with all these blessing agriculture is not so popular as it deserves to be. Too many of our young men consider it as a mere means of subsistence, as too slow and tedious for this fast age; and parents, more fond than wise, too often educate their sons for professions already overstocked, and send them to cities and marts of trade, where many a weary hour is spent in waiting for employment, or in the dissipation consequent upon idleness. Business in cities holds out the inducement of speedier and larger profits. But we must remember how very few among the merchants and traders of our country ever arrive at fortune, and let us also remember how very few skillful farmers ever fail to realize it.

Let me counsel my young friends to deliberate well and long in selecting between these occupations of life. In the one, the risk is always uncertain, and the prospect of ruin imminent. In the other, success is as sure as the promise of the Great Jehovah, who has said,

"while the earth remaineth, seed time and harvest shall not cease." In the one, there is a constant temptation to vice and immorality, that many a youth has found himself unable to resist. In the other, there is an elevation of sentiment, and a deep religious feeling that always results from a constant association with the works of nature. In the one, there is the close confinement that brings with it the faded cheek and the premature wrinkle; in the other, there is the ruddiness of health and the sweet repose of labor. With many of the rising generation there is a strong ambition to ascend to the higher grades of life, and a consequent disrelish for manual labor. Did these young gentlemen ever reflect that there is no situation in life where labor is not required, and that to achieve eminence in any profession or trade, often requires more bodily fatigue than falls to the lot of the agriculturist? If professional and mechanical labor are not considered disreputable, why should agricultural toil be regarded with so much dislike? Labor is necessary to us all, and it generally brings with it the sweet rewards of "health, peace and competence."

"There is not a man, from the sceptered king
To the peasant that delves the soil,
That knows half the joys existence can bring
That does not partake of its toil."

Let me tell the aspirant after political and professional fame that, after he has achieved success in his pursuit, and gained the applause of man, which ceases when he retires from the public gaze, that when he looks back upon his successes and his triumphs, he will feel far less true joy in the retrospect than he who, with a truer perception of the dignity of human labor, has reclaimed from barrenness the fields of his home, has clothed its hills and dales with beauty and with verdure, and has wounded no heart and crushed no rival spirit in the prosecution of his noble work.

And let me, moreover, tell fathers and sons in this assemblage that, before long, agricultural education will assert for itself a place among the highest attainments of the human intellect; that the art, now so despised, will be the chief support of the temple of science, and that, under its fostering influences, more speedily than under any other, will men achieve for themselves the fame and the wealth that are now the objects of such greedy pursuit.

As a class, farmers have learned to depend upon themselves, and it is a gratifying evidence of the prevalence of this feeling that, while we contribute to the support of government nearly all its revenue, we rarely ask any of it back in the shape of favors. While governments spend millions for improvements in the arts and sciences, while it offers premiums for implements of war that destroy human life in the greatest profusion and in the shortest time, the same records show no favors extended to agriculture, no reward for the improvement of the soil, and no return for the labors of him who, in laboring

for the cause of husbandry, is laboring for the cause of human progress.

As American farmers, we occupy the most desirable position on earth. While in Europe the tiller of the soil owns no land, but works for the landholder, making for himself a bare support, while his labors enrich the favored few, here every man is or can be lord of his own domain. Every tree that he plants bears its fruit in due season for him alone; every acre is his, to plow and sow and reap and till just as he pleases, and every dollar that he earns is so secured to him, by law, that it is felony to take it from him without his consent. In England one man out of every four hundred and seventy is a landholder, or, to use the strong language of another, "for every one privileged man, there are four hundred and seventy who have no right to put their foot on any land but the public highway." Here our children stand an equal chance to be President, Governor, Legislator or Judge, as the children of the wealthiest and the best among us. There, there is an impassable gulf between the children of the rich and the poor, the peasant and the noble. Here, food is so abundant that it leads to wastefulness; there, there is a constant apprehension that the scanty meal of to-day may not, through sickness or other accident, be supplied for to-morrow. Here, law protects the necessary comforts of a farmer's home; there, a heartless landlord may seize the last bed, and render houseless and desolate the family of his poor tenant. There, one-tenth of the peasant's labor is taken from him to support an established church; here, we worship God as we please, and no human power can force from us any other than our voluntary oblation to the ministers of religion.

These are some of the points of comparison between the condition of the farmer in America and England—that England whose abhorrence to American slavery is in such strange contradiction to the bondage of her own peasants—that England whose unceasing cry against us for the existence of an institution that her own avarice has brought upon us, is so speedily and so fearfully echoed by the smothered cry of her own white slaves for food, for education and for equal rights.

This comparison of the relative condition of the two classes of farmers, that could be extended almost indefinitely, is enough to satisfy us of our superior advantages, and excite our gratitude to the Creator for such blessings, and teach us to value as dearer than life our civil and religious freedom.

Gentlemen, the surest safeguards of our political institutions are with us, for our agricultural blessings are too numerous, too diversified and too closely connected with individual and civil liberty even to be surrendered at the call of faction, or sacrificed upon the altar of party. Our pursuit is eminently religious in all its bearings, for I defy any man who has the ordinary perceptions of humanity to walk through fields luxuriant in verdure, through forests in which autumnal hues of every shade are so richly and so beautifully blended, to watch the

swelling bud, the waving corn and the golden harvest, and not feel the conviction strong upon him that there is over man a superintending providence of love and wisdom and power. Our profession is also the best school of thought, for it tends to relieve nearly every want to which human nature is subject, elevates man, by daily communion with the fairest works of God's creation, and its intervals of repose are intervals of health and security. It is also the loftiest school of patriotism; our homes, our firesides and our fields are connected to us by ties of love so sacred and so strong that no invader of our land will ever reach them save over our dead bodies.

And if it should happen that any foreign foe should set his foot upon our soil, it will be the glorious task and the glorious duty of the tillers of the earth to rescue our beloved land from the degradation of conquest.

Yes, true to God, to freedom and mankind,
If their chained band-dogs foemen should unbind,
These stately forms that, bending even now,
Bow their strong manhood to the humble plow,
Shall rise erect, the guardians of the land,
The same stern iron in their same right hand,
Till our hills thunder to the parting sun,
Their sword has rescued what their plowshares won.

LECTURE ON SOILS.

Mason C. Weld, an agricultural writer of good report in New England, recently delivered a lecture on soils before the Horticultural Society of the American Institute, of which the *Tribune* makes the following report:

To the plant the soil is its birthplace, cradle and grave. In part it is its food, and in part the trencher from which it feeds; it is its sole drinking cup, its anchorage as it is swayed to and fro in the gales. What is the soil, whence comes it, and will it always remain fertile? With our lenses we may examine the finest soils, and will find them largely composed of bits of stone—the ground down particles of this or yonder mountain chain—incorporated with which is the decayed vegetable matter so necessary to fertility. The beginning of a soil is the fine dust and bits of moss with the particles of stone cracked off by frost, and washed or blown into the cracks of rocks, or collected under the lichens attached to the frost-fissured surface. This small beginning, compacted by water and acted upon by air, forms a suitable rooting

place for delicate mosses and other little plants, which live their short lives while moisture lasts on the shallow soil.

This soil, thus begun, catches and holds the blowing dust, the wear of the rock, and incorporates into itself the vegetation which grows and dies upon it. So it accumulates until it fills the crevices, and loose stones are covered. Many plants thrive upon the ever-deepening soil, and the hillsides are finely covered. Shrubs and trees strike deep their roots, drop their leaves, or dying, their whole substance becomes part and parcel of the soil. Acted upon by winds and rains, the tendency of all soils is to seek a level, and gradually find their way into the valleys and plains. Soils are constantly forming, and moving as they do, rarely increase to much extent save in the valleys, and here the tendency of that deeply buried is to form a hard pan, the first step in the transformation of soil back again to rock. This turning of soil to rock again is a natural result of heavy pressure, with percolating water bearing lime, iron, alkaline salts and silica among it, thus hardening or cementing it together. Causes producing effects like these have ever been going on, and all contribute to maintain the verdure and fertility of the soil. Some of the volcanoes afford us good opportunities for the study of soils, and where, at some former period, the torrent of melted lava covered whole districts, destroying all vegetation, leaving a thick crust of scoriæ, sand and ashes, or even solid rock, which, within the historic period, had been converted into pastures, fields, vineyards and even forests.

So extensive are the deposits of stones, gravel, sand, clay, etc., left there by the agencies already alluded to, that it is a comparatively rare thing to find a soil formed directly or chiefly from the rock upon which it lies. The most common rocks being usually mixtures of different minerals in their composition, furnish soils, as a general thing, containing all the elements necessary for the growth of agricultural plants. Trap rock consists chiefly of feldspar and hornblend, granite of feldspar, quartz and mica. None of these, of necessity, contain sulphuric or phosphoric acid, without which no soil can be fertile. But intimately mingled with these minerals are found, in conspicuous forms, other minerals, viz: Phosphates, sulphates, iron, manganese, etc., which are of vital importance to the soil, so that the all-wise Father has provided on the surface everywhere that the earthy essentials to fertility shall not be wanting.

Besides these mineral elements, which give no evidence of having a part of either animal or vegetable organization, there are organic elements, or that part of the soil which results from the decay of animal or vegetable life, or has in some manner been produced by it. If a soil in the condition of fine, dry powder be put into an iron spoon and heated, it will smoke, turn dark colored, and, perhaps, burn with flame. By this process all the organic portion is driven off, while the inorganic or mineral remains. This organic part is called humus, or vegetable mold, and is the result of the action of the oxygen of the

air upon the dead vegetation in or upon the soil. Soil containing less than five per cent. of this vegetable mold are considered poor in humus; those having five to ten per cent. are "humus soils," or those rich in organic matter, while those with more than ten per cent. are peaty soils, and are found in every wet place.

Now let us look at growing plants, for which agricultural soils must be adapted. These plants are found to consist of an organic portion which burns or is driven off by heat, and an inorganic portion left in the residue or ash. In its growth the plant obtains the minerals which add to its bulk from water, from the air and from the soil. The earthy elements of the plant come directly from the soil, while the others, oxygen, hydrogen, carbon, nitrogen, etc., are derived from the air and from water. De Sausure, in the early part of the present century, first made known the fact that plants would not grow unless they found in the soil the ingredients of their ash. This has repeatedly been confirmed, and it now seems strange that what is at present so well established as the very groundwork of agricultural reasoning, should have caused so much investigation. A soil was imitated with comminuted platinum, washed with acids and heated to redness, consequently containing nothing which a plant could appropriate. The seeds planted in this soil germinated and grew for a while, but when the ash ingredients contained in the seeds were used up, they died. The substances found in the ash of plants are potash, soda, lime, magnesia, oxides of iron and manganese, chlorine and carbonic, sulphuric and phosphoric acids. These are absolutely essential to the perfection of plants. Another experimenter, Prince Salm Hotsmer, found that the oat would not thrive and perfect seed if a single ingredient of the ash was withdrawn from the soil. The plant receives these ingredients in the water, absorbed by its roots; hence, nothing in the soil is available as plant food, which is not readily soluble in water.

When these facts became known everybody saw at once the great benefit chemistry was about to be to agriculture. The plants must be analyzed and their demands upon the soil known; then the soils must be analyzed, and what they lacked made apparent, and, lastly, the manures must be analyzed, or at least those obtained that would make any soil which the crop to be raised demanded. Agricultural chemistry was one of the most beautiful branches of science. The world was entering upon a new era in the art of cultivating the soil, and the rate at which it was making progress must have been rather alarming to the old fogies. But, alas! the science was in its infancy, and it had been too heavily laden by these Utopians—it failed to do this work. It soon became apparent that no soil analysis, when made in the best possible manner, could show the fertility of a soil. Practically, soil analyses do not exhibit the available constituents of a soil with any very great degree of accuracy. Charlatans who talk learnedly advise those who consult them to have their soils analyzed, and on the strength of these analyses make prescriptions for the soils—

often, too, with excellent results. For where is the soil that bones, gypsum, ashes, etc., will not benefit?

Water is not only indispensable as a solvent of the plant food, but it is food itself. The absorption of water takes place through the roots alone, hence, all the water plants receive comes through the soil, and much of it is breathed out through the leaves. The immense quantity of water thus transferred from the soil to the air is hardly conceivable. It often amounts to more than the entire rainfall. Mr. Lawes, of England, estimated that for every grain of solid matter added to the plant in its growth, it transpired one hundred and fifty-six to two hundred and seventy grains of water. A crop of grass, therefore, which weighs three or four tons would have transpired six hundred tons of water. Soils always contain much water, even in the tropics, and the avidity with which an artificially dried soil attracts moisture from the air makes it one of the most powerful drying substances known.

The finer the particles, other things being equal, permeability to air and moisture not being checked, the more fertile the soil. Two soils analyzed, a few years since, one from the Scioto Valley, in Ohio, the other from Vermont, gave the same ingredients, though the Vermont soil would yield only meager crops of buckwheat once in two or three years, while the Ohio soil had produced yearly, for many years, fifty to eighty bushels of Indian corn per acre, without manure. The only difference seemed to be in the firmness of the particles. Mechanical analyses, or the separation of the soil into portions of different degrees of fineness, first by sieves, then by washing, has been suggested as a means of measuring the relative fertility of soils, and, in connection with chemical analysis, has given some excellent results.

A finely pulverized soil, worked to the depth of several feet, will supply the plants with a greater quantity of water, and the plant food contained in it, during hot and dry weather, than a shallow and less pulverized one. Water rises in capillary tubes, and the finer the tubes the higher it will rise. Of all the constituent parts of a fertile soil, humus, or vegetable mold, attracts and holds the most water, and is the slowest to give it up except to the plant. It also attracts and retains valuable gases; its own decomposition affords carbonic acid, water and ammonia, besides increasing friability, permeability, and that openness and crumbly character possessed by all rich and good soils. Its increase in the soil is therefore often a matter of the highest moment. One of the properties of every fertile soil is that of arresting the most valuable kinds of plant food in their passage through it. The humus has this property, assisted by the clay and mineral substances. Humus, like charcoal, which it resembles, is a powerful disinfectant, or consumer, of decaying substances, hence is useful in absorbing the valuable products of decomposition in a soil. As the passage of water through a soil is productive of no harm, while that which runs from the surface bears away much that is valuable, soils

should be drained either by nature or by art. Nature often drains her soils too well—often not enough.

A soil may contain all the ingredients necessary for fertility, be sufficiently moist, and still not be fertile unless air have free access. Much of the vast amount of water transmitted through the plants is obtained first by the soil from the air. The more open and finely worked the soil is, the more susceptible will it be to the free passage of air into and through it. Such is the soil—a synonym of filth, yet it is the most efficient purifier of unclean things. It furnishes from its never-failing storehouse the materials which, transformed, fill our granaries, load our orchards, refresh and rejoice the heart of man.

SCIENTIFIC FARMING.

Scientific farming is all very well; but it must be confessed that a man may have a good theoretical knowledge of agriculture, and yet make a very poor farmer. Order, system, personal attention to details, with steady, persistent industry, will enable a farmer to succeed without the slightest attention to science, while, on the other hand, the most thorough scientific education will be of little use to the man who has not these qualities.

If a man who has the advantage of a scientific agricultural education turns farmer, he will be pretty sure to make mistakes which will subject him to the ridicule of his neighbors. He may be the most quiet of men, be entirely occupied with his own affairs, interfering in no way with those of others, but, no matter; those of his neighbors who have less to think about will be sure to talk over all that he does, and their comments will not generally be of a complimentary kind. He may feel that this is uncharitable; but he is not much of a man if he is annoyed by it. Let him keep on the even tenor of his way. He will make many mistakes, but if he is a sensible man he will soon rectify them. Correct agricultural knowledge, even if it is simply theoretical, will in the end prove of great advantage to him. If he has the energy, patience, industry, prudence, forethought and enterprise necessary to make a good farmer, his scientific acquaintance with agriculture will inevitably enable him to succeed better than those who are destitute of it. But he must not be too sanguine. Agriculture is slow work. A farm cannot be brought into order and a high state of cultivation in a year. It is the labor of a life.

The scientific man, who thinks that he can take a farm and raise large crops by the use of a few chemical manures, is doomed to disappointment. He will be very apt to neglect those little details of farm

economy which are absolutely essential to success. While he is thinking of acids and alkalies, of nitrogen and phosphates, his cattle will knock down a fence and be eating up his crops. While he is studying Liebig, his men will be taking a *siesta* in the hay-field. Careless hands will soon break his improved implements. He may think to economize food by cooking it, but without constant surveillance his men will waste more in a day than he can save in a week. They will take pleasure in thwarting all his pet plans, and will harrass and perplex him in every conceivable way. The end is disappointment and disgust.

But it is only the mere dabbler in science that expects to revolutionize agriculture. The truly scientific man has moderate expectations. He does not know, and never expects to know how to transmute iron into gold, or to raise a hundred bushels of wheat per acre as easily as we now raise ten. If any discovery he can make, if any modification of present practices will increase productiveness of the soil five bushels per acre, he knows that he would be one of the greatest benefactors of his race. Such an increase in the wheat and corn crops in the United States would in a few years pay off our national debt.

No; deride science who may, its judicious application to American agriculture is the great want of the nation. So far as material prosperity is concerned, and our ability to carry on the war and pay our enormous debt, an improved system of agriculture is of the first importance. We must farm better. We can pay our debts, but our ability to do so will be in proportion to the increase in our agricultural products. We have one of the finest agricultural countries in the world—but this alone will give the government no revenue. Labor is the true source of wealth, and anything which economizes labor, and makes it more productive, adds to our national prosperity; and this is the aim of scientific agriculture. It will give us a beeve at two years old as large and as fat as an ordinary four year old. It will make one acre produce as much as three. Instead of the average hay crop of this State being half a ton per acre, we should have two tons. I wish every farmer in the loyal States could at this time see the importance of straining every nerve to raise larger crops. The longer the war goes on, the more it will be dependent on the farmers of the country; and when it is over the debt must be paid from the soil.—*Genessee Farmer.*

THE HOME MARKET FOR OUR CROPS.

Agriculture is the basis of a nation's strength, and it is just in proportion as agriculture is fostered and improved and extended that a nation becomes permanently prosperous. How, then, can we accomplish this great purpose? By fancy gardening and farming, wherein no one can indulge who has to make a living from his crops? By dependence on foreign markets, which sometimes fail us, and are always regulated by the state of their home crops? Or is it not rather by the application of the rules of reason and common sense to it as a regular business, by studying economy of management and production, by seeking to save labor through the use of machinery, by closer cultivation, and, above all, by a dependence on a home market?

Agriculture has been the pride and boast alike of the slave and the free States of this republic, and the enormous crops it has produced stand on record as splendid achievements of American energy. But the crops of the free States did not depend on a foreign market, because the growth of population at home, under the stimulus of manufactures and a diversified industry, made the home market permanent and extensive, while, on the other hand, the crops of the slave States looked to the foreign demand mainly, and to but little extent to the demand within their own borders, the domestic consumption being chiefly at the North. As a consequence, the agriculture of the South, whose staples were among the most important known to commerce, did not enrich that region, but passed out of her grasp to enrich England and the free States, while our agriculture has become an exhaustless source of national strength and prosperity, and has gone on feeding and sustaining all the elements of our greatness.

The agriculture of the South, powerful as it was, left no evidences of its power in the South itself, because it did not enrich the South. If the staples it produced had been manufactured there, then the South would have been a region of prodigious strength, wealth and resources; but that it had nothing of that kind was rendered clearly manifest by the war. The home market, then, is of the utmost possible consequence to agriculture, and whatever fosters the growth of that home market befriends the cultivator of the earth far more than the mere factors who ship the crops abroad. The wealth accumulated in manufactures increases the value of the farmer's land, crops and stock. It furnishes him better implements and machinery, and puts within his reach more of the comforts and luxuries of civilized life.

If the farmer or planter has a substantial home market for his crops he can always rely upon it, and is removed from dependence upon the uncertainties which characterize the foreign demand. If the cities of the interior turn their attention more and more to the rearing up of manufacturing interests, for all of them have more or less done so

already, the agriculturist does not have to look abroad to find consumers for his produce. Every city and town has its market for his produce. No one can say that the South is better for sending its cotton to Europe than it would have been had it established cotton factories in its own cities, and become itself a great manufacturing community.

In fact, the South was impoverished because its interests were not diversified. Being a purely agricultural people, the Southerners could not create a commerce of their own. All the money paid for their crops had to be paid away again as fast as it came, for foreign and Northern goods. Wealth, real wealth, did not accumulate at the South. When the great test of civil war came, the planter found that all his means were in his land and in his slaves, and therefore he could not furnish the money to carry on the war. He had looked to the sale of his crops to furnish the money, and the blockade deprived him of that resource. Had the South been a manufacturing region, that blockade could not have affected it seriously. But as it had no home market, and had raised crops solely for export, the blockade rendered its agriculture of no avail whatever as a source of strength.

This was the perfect work of a crazy devotion to the free trade theories of the British school of political economy. Free trade phantasies had induced a sort of dislike for manufactures which rendered protection useless to them. It was common among such men to exaggerate the miseries of the English factory towns, and consider them inseparable from all manufactures, ignoring the fact that the French and American factory towns exhibit no such social degradation and distress. It was usual among these free traders to appeal to American prejudices, and ask whether our people were willing to introduce into our cities the misery of the English factory towns. It is true that the old friends of protection throughout the South strove hard to counteract this pernicious tendency, and that factories were established in many Southern cities; and it is a curious fact that just in proportion as those efforts were successful did the South have resources to enable it to sustain itself in the late four years' struggle.

We appeal, then, to the agricultural interests of the whole country against the renewed attempts of the free traders to discourage manufactures. All we ask of them is to reflect in a plain, business way, whether their prosperity would not be enhanced by looking to the home market for their produce, and by enlarging that market so as to be able to consume all their produce. We ask the Illinois farmer whether he would not prefer to have his market in Illinois itself, rather than to be compelled to ship his crops to the seaboard to seek a market in Europe? And we ask him whether that Illinois market cannot be established by converting Chicago, Galena, Springfield, and all the other chief cities of that State into manufacturing towns?

Commerce may breed up cities full of lazzaroni, but manufactures do not. Whatever misery may exist in Manchester and Birmingham, England, it cannot approach the idleness, vice, destitution, crime and

degradation of New York, London, Naples, New Orleans, etc. The reason of this is evident. The farmer sends to the cotton mills his girls whom he cannot employ at home, and his boys whom he cannot start with the farm. All who want bread can obtain work in the factory towns. By this process agriculture is benefited, since it enables the agriculturists to get rid of the constantly arising surplus population. At the South the surplus slaves were sold off to distant regions as the area of cultivation extended, while surplus whites, having no resource at all, sank into misery, destitution and ignorance, and became even lower than the slaves in the social scale.

In those portions of the South where manufactures were established, the surplus whites escaped this fate and earned a good living. Now that slavery has been abolished in the South, manufactures must be greatly extended there, or the social degradation of the surplus population will become greater than ever. Agriculture cannot employ the whole mass of a population without the community sinking in the scale of civilization, and becoming in a great measure dependent upon foreign countries. The farmer needs the manufacturer more than he does the merchant, and he needs him just as much as the manufacturer needs the farmer. If the manufacturer be in England and the farmer in America, each is dependent upon some other country than his own for what keeps alive the flame of civilization. But if the farmer and the manufacturer both be in America, why then we are self-supporting, and our civilization can keep itself alive.

In the late terrible war the raisers of the American cotton crop discovered, to their surprise, that they did not control the commerce, manufactures and civilization of the world, as they thought they did. England was not ruined by the deprivation, nor were the free States. We all managed to get along without the Southern cotton, or to get some of it despite all efforts to prevent us. The war cut off the cotton States from getting any manufactured goods, and so, after all, the command of their great crop was of no practical avail to them. Had they improved former years as we did, by establishing factories at home, this deprivation would not have been so serious to them. But they had spent their lives in ignoring the home market, and the consequences were terrible.

The question now is whether we shall all profit by this lesson, or whether we shall go on building up merely enormous agricultural interests, for which the chief markets are abroad, and much of which will be rendered as useless as the Southern cotton crop by the first great European war in which we may chance to be involved. The vast grain crops of Russia render Europe in nowise dependent upon us for breadstuffs or provisions, while recent experience has shown us that England can obtain cotton without us. Splendid as may be the results of our rapidly advancing agriculture, there can be no permanence in them so long as the chief markets for our crops are abroad.

Commerce is an adjunct to agriculture, but not an alternative. It

cannot employ the surplus population, though it may exchange crops for merchandise. Manufactures are indispensable to all healthful civilization, and any condition of society which discourages this sort of industry must remain permanently subordinate in the scale of enlightened development, or be liable to deterioration and lapse into barbarism. Hence it is to the interest of agriculture to encourage the growth of home manufactures. Let us go on extending cultivation as much as we may; it is our duty to devote equal attention to the enlargement of all the operations of productive industry. Let us reëstablish the cultivation of cotton until the crop again reaches five millions of bales, but let us at the same time build more cotton factories, increase the capacity of those we now have, and strive to use this cotton crop here at home. Every Southern city and town should have such factories. So wherever tobacco is grown at the South, tobacco factories should exist.

That such a desideratum can easily be reached, is apparent from the work already accomplished. American capital, skill and enterprise are fully equal to the task. If the farmer appreciates his own interests properly, he will put his surplus capital in any neighboring undertaking which seems to promise well, and put his hopes for the future in the great home market which manufactures must surely build up for his benefit and that of his posterity.—*North American.*

PROCEEDINGS

OF THE

MISSOURI STATE HORTICULTURAL SOCIETY.

The sixth annual meeting of the Society was held in the Supreme Court room, St. Louis, on the tenth of January, 1865, and the three following days.

President Mudd in the chair.

The meeting was opened by prayer by the Rev. Dr. Elliott.

The President then delivered his annual address, as follows:

The ever-watchful care and guardianship of Him who ruleth all things, extended in our preservation from the many dangers which threatened us during the year that is past, enables us to meet, under many evidences of His continued favor, for the sixth annual convention of our Society. Our lives have not only been preserved as in times past from the ordinary ills or casualties which must sooner or later destroy, but we have enjoyed His favoring care in our protection from the unknown dangers incident to an unnatural civil strife; from destructive invasion by a cruel enemy, waging this unnatural war in the interest of a wicked rebellion.

It appears to me to be just cause of congratulation to the members, that we have not only been able to keep up our organization as a society, while much of our State has been overrun by war's destroying trains, but have, also, made much valuable improvement in horticulture and pomology, both in planting and improved arts of cultivation, and in improved varieties of many fruits introduced amongst our people. Ours is the only State Society, organized to promote any of the interests belonging to the great family of agriculture, which has been able to maintain its organization and annual convocation.

In December, 1863, the Legislature passed an act to establish a State Board of Agriculture, but owing to the indifference or neglect of some of the gentlemen named in the act, three several attempts to organize the Board have proved abortive for want of the attendance of five members required by the law to constitute a quorum. In view of the importance of some attention to the establishment of a State agri-

cultural college, and the absence of any State agricultural society, this failure to organize the State Board of Agriculture appears to be particularly unfortunate.

In ———, 186–, the Congress of the United States passed an act for endowment of State agricultural colleges. If our State complies with this act, we would be entitled to three hundred and thirty thousand acres of land to provide an endowment fund. This cannot be used for building, nor for the furnishing of college or farm. This act requires that there shall be in operation, in each State accepting the grant, within five years from the date of the act, at least one agricultural college, leaving it to the State to provide the necessary buildings, furniture and apparatus. The finances of our State are in such deplorable condition that we would, with great difficulty, get any direct appropriation from the ordinary revenues of the State; and it is feared that one from this source, adequate to the purpose proposed, might appear to be unjust to the creditors of the State. But there is in this city a piece of property held by the State, which peculiarly belongs to the agricultural interests. If this property has not always been a tax to the State, maintained in the interest of partisanship, it has at least ceased to be of capacity sufficient for or even necessary to the interest it claimed to be provided for. The tobacco seeking a market in our city is now or can and will be as well furnished with means of storage and sale by private capital and enterprise, as is the hemp, the corn or the pork sent hither for a market. The State Tobacco Warehouse is regarded as a nuisance in the portion of the city in which it is situated. Its sale will probably be ordered by the Legislature during the present session. We think the proceeds rightfully belong to the agricultural interest of our State. This interest was never in so great want of those means, probably never will be again, as it is at this very time. It is submitted you whether or not our Society shall, at this meeting, again memorialize our Legislature on this subject, asking that provision be made for the sale of this property, and that the proceeds be held sacred to the establishment of an agricultural college, as contemplated by said act of Congress, and for such experimental farm and gardens as may be deemed desirable and the fund be found adequate to provide.

I would recommend to your consideration the practicability and propriety of establishing, in connection with and for our Society, a library, to embrace the horticultural, pomological and agricultural works and periodicals regarded as authority of value at this day.

Since the last annual meeting, our Society has lost one of its most intelligent and useful members. Captain C. C. Manwaring was, almost at his own door, in presence of his wife and children, cruelly murdered by the bushwhackers who have infested our State. A devoted husband, an indulgent parent, a warm-hearted, generous friend, an ardent and zealous patriot, our friend, in his life, illustrated the

virtues for which, while we mourn his loss, we will ever cherish his memory.

The Business Committee will recommend to you a change in the order of discussion on fruits, placing the grape first on the list. Believing the grape to demand of us now especial attention, that its successful production requires a more skillful and intelligent cultivation, I bespeak for this recommendation of your committee a favorable consideration.

It is believed the proceedings of our last annual meeting make one of the most useful, interesting and entertaining books ever published, as the transactions of any horticultural meeting in the United States, the criticisms of "Laclede," in the newspapers, to the contrary notwithstanding. It will be seen by reference to our programme, that we have just half as many addresses and essays promised as we had last year. If the criticisms of "Laclede" did not frighten modest talent from engaging to address us, they at least furnished the indolent with an excuse for declining the undertaking. It is hoped, as we shall have so much more time for discussion, that "Laclede" will not continue to hide his talent (of which he evidently has much that should be useful) by remaining an "outsider," but that he will come to our assistance with his counsel and instruction, and thus do what he may toward giving our Society the "wide-spread and beneficial influence" he hopes to see us exercise over the State. It is believed he will soon see the advantage which friendly counsel and kindly intercourse has over anonymous fault-finding in mending the ways of men, even those who may have made progress enough to try to become horticulturists.

It was, on motion of Mr. Jordan,

Resolved, That a committee of three be appointed by the President to take into consideration the annual address of the President, and recommend the action that will be necessary to be taken by the Society in order to give effect to the suggestions contained therein.

The President appointed Messrs. Jordan, B. Smith and Tice said committee.

The Business Committee presented a report embracing the details of the order of business for the session, subject to such modification as shall arise during the session.

"As our State is unsurpassed in its adaptation to the growth of the grape, and as its cultivation requires more intelligence and experience than most other fruits, and as cultivation is yet comparatively small proportioned to the capacity of the State and the demand for the product, your committee have thought it appropriate to commend it to your first and most mature consideration, believing that in doing so they have consulted the interest of both producer and consumer. That when the vine shall cover a thousand hills, and the pure juice of the grape shall take the place of malt liquors and the poisonous com-

pounds of corn whisky, drunkenness will be diminished, morality promoted, the happiness of the people increased, and the interests of the State advanced. All of which, etc.

"H. CLAGETT, *Chairman.*"

It was, on motion,

Resolved, That a committee of three be appointed to assign places of entertainment to members from a distance.

President appointed Mr. Clagett and Messrs. McClure and Jordan said committee.

The Treasurer presented the following report, which was referred, on motion, to a committee of three, consisting of Messrs. Essex, Kelly and Dr. Barron:

JOHN H. TICE, *Treasurer, in account with the Missouri State Horticultural Society.*

DATE.	SPECIFICATION.		AMOUNT.
	DR.		
January, 1864...	For amount received from members, being annual dues for membership		$64 00
	Received of B. Smith, subscription		10 00
	Carew Saunders, amount of collection		22 00
	Subscription from Messrs. Flagg and Jewett		15 00
	Browning and Fine, for copies sold		1 00
			$112 00
	CR.		
January 22, 1864	By amount of sundry warrants paid to H. T. Mudd	$22 20	
	Warrant to Woodson, Janitor	8 00	
	Warrant to Muir, Secretary	30 00	
April 6, 1864.....	H. T. Mudd, on printing account	49 50	
January 1, 1865.	Balance on hand	2 30	$112 00
January 1, 1865.	To balance brought down		$2 30

Mr. N. J. Colman said he rose to introduce to the Society, and propose for honorary membership, a gentleman who, by his great liberality and untiring energy in the publication of agricultural and horticultural books, had done more than perhaps any other man in fostering and promoting those arts—C. M. Saxton, formerly of New York, now of St. Louis.

Mr. C. M. Saxton was unanimously elected an honorary member.

The President read a letter from Mr. E. Beaumont, Bloomington, Ills., which was, on motion, referred to Committee on Publication.

BLOOMINGTON, January 9, 1865.

H. T. Mudd, Esq., President, and Brother Members:

According to your cordial invitation, I had made all necessary preparations to be present at your meeting, but from unexpected circumstances, I regret to say, that I am compelled to decline this pleasure until next year.

As I cannot be present, I will take the privilege of writing a few remarks, which I believe will be acceptable, in their proper place, ac-

cording to some, and useless according to others of the brothers; but as we are bound together by mutual conjunction to work for the progress of the good cause in which we are engaged, I will try to throw off some prejudices which are brought and nourished by a few of the brother members.

These prejudices are against grape vines raised from single eyes. I am not going to give any illustration on grape culture; I have no doubt there are several among you who have more experience and are consequently abler to do so. I will limit my remarks to the mode of propagating above mentioned.

Grape culture has had within the last few years such an immense development that propagation has been the most essential and best paying part of it.

The demand for plants was so large that many experiments were tried to increase the stock as fast as possible; the best and most proper way to answer that purpose was single eyes. Millions of plants were raised in that way, but as the demand was still larger than the number of plants raised annually, other experiments were tried and plants from green wood were produced; from such plants come the prejudice which now exists, and is applied invariably to all raised from single eyes; but as far as my experience is concerned, I would say that plants raised in that manner from sound, ripe wood, are equal to the best layers and cuttings ever raised, and far better than a good many of that class, for I have seen layers paid a big price for on account of their big top, where roots could hardly be seen; the same with cuttings. I have seen in the East several vineyards planted with single eye plants, which will never be surpassed by those planted with layers and cuttings. I will mention the vineyard of a well known gentleman, R. H. Mace, Newburgh, New York. Three years ago I visited his place, and to my admiration saw three acres planted with Delaware, which, after two years' planting, each plant had two canes twelve feet long and of large sized bearing wood. I don't know anything that can surpass it, and in other places I have seen such results obtained.

To illustrate my remarks I send you a few samples which have been grown by us last year, which I wish to be submitted to the scrutiny of any of those who have any prejudice against them, and I am confident that after they have seen them their prejudice will be removed. Those plants were only started in a greenhouse about the first days of March, and transferred to the ground in the first days of June, without any protection whatever.

Hoping your meeting will pass off pleasantly, I remain, yours,

E. BEAUMONT.

N. J. Colman: I want to hear those views refuted. I concur in them. There is much prejudice against "single eye vines," while it should rather be against the manner in which they are produced and the wood employed in their production.

I ask if budding, the method employed more extensively in propa-

gating all other plants, is anything else than single eyes? and the single seed we plant, whether of apple, peach, corn or wheat, is but a single eye? And the bud and the seed are alike embryo plants, perfectly adapted by the Creator to the propagation of the variety. It is not attempted to be shown that three or four eyes make a more perfect plant than a single eye. It is precisely so with corn in the hill. If you take weak eyes or from unripe wood, you cannot make good plants. Then you must not raise them in too crowded a manner, but give them plenty of room, light and air. You may start them in the plant house, but you must transplant them to the open ground; you must expose them to the winds, and dews, and rains, to harden, firm, develop the plant and fit it for the vineyard. I notice an article from a French work on this subject. There they take the best eyes from the best wood. They cut the eye with an inch of wood in the fall, plant the eyes in well prepared ground, nine inches apart, in rows two feet apart; cover with three inches of soil, and in this manner they produce the best of plants. Mr. Knox starts his plants in the hot house and transfers them to the open ground, with the best results.

We must understand that the fault is not in the single eyes, but in the system by which they are produced.

Mr. Kelly: When this mode of propagation was first commenced the plants were raised in pots entirely in the house, and this gave rise to the prejudice against them. We want care to plant them out in the open ground; then they make a natural growth and good plants.

Dr. Bircher: I have been in the vineyard and nursery business in Europe and this country till the last fifteen years, and have tried layers and single eyes. Started in the house and transplanted to the open ground, they may do well. I planted out two hundred single eye plants; I set them down in the ground seven inches, and they grew three feet in the first season. These plants are generally cut too short in the cane to allow them to be planted deep enough, and should be planted out another year to make a large growth, before being planted out in the vineyard; then cut the canes to fifteen inches; plant so that the upper eye is at the surface, and you will have a good vine. (In answer to question.) The soil should be prepared two and a half feet deep, and the plant set at least fifteen inches deep. This keeps the roots from drying up in our hot summers. Cut off the top roots, and this prevents the vine being affected by the variations of this variable climate, and you will have less rot.

Mr. J. M. Jordan: In taking some old vines in their wild state, I found no root a foot below the surface, while the surface was a perfect mass of roots. In planting deep the rootlets at the bottom rot off. We must learn from the book of nature. Last season was very dry; I kept the soil perfectly stirred; the soil was always moist, and the plants did not suffer from the drouth.

Dr. Morse: (exhibiting a vine) I ask a question. I have planted

such roots as these (two feet long) and I cut them off to six or eight inches. Does Dr. B. think this needful?

Dr. Bircher: Exactly so.

Mr. C. M. Saxton: I trenched a piece of ground three feet deep, but did not plant deeply, and the vine roots came all to the top. The vines seek everywhere what they want. I planted seventy-three single eye vines; the second year they bore a little fruit, but took it off; the third year got two bunches from each vine; the fourth year I got a thousand pounds of fine fruit.

Dr. Bircher: There is much difference in the soil. If the soil is sandy you can hardly plant too deeply. There are no roots three feet deep in our clay. Here we should trench. If the soil is very heavy it should be drained, then there is but little trouble with the "rot." Ten inches may do in gravelly soil.

Mr. E. R. Mason: Before engaging in grape culture, some five years ago, I found great diversity of opinion upon this subject, and am now propagating on a small scale. I am satisfied that the best plants for producing fruit are produced from "layers." In selecting wood I take low shoots that have been pinched in the previous year, and lay them down in a compost prepared of leaf mould. When the eyes break I cover with this soil from time to time. Every eye makes a plant, with a cane from four to five feet long. Sometimes there is fruit the first year. Its rapid growth is from the support it receives from the mother plant. The single eye system makes good plants if well carried out. It is difficult to make many plants by layers after the vineyard is in full fruit, and it is not well to do it. I have planted many single eye plants, and think they lose about a year's growth.

Mr. N. J. Colman: I was in hopes to hear something against single eye plants. I heard Mr. Jordan say he had dug up large vines, grown in their natural state, with stems six to eight inches in diameter, and the ground was covered with surface roots, and scarcely any that were even a few inches below the surface; and that from this we should "follow nature," and plant our vines shallow. If we follow nature in this we will find the vine running up to the tops of the taller trees, but scarcely a bunch of grapes of any kind on it; while vines of this size, trained and cultivated, produce annually six to eight tons of magnificent fruit.

Dr. Miner: I want to arrive at a correct conclusion as to how to plant a vineyard.

In my youth my father was building a house, and in digging the cellar had to dig a long drain, three feet deep and two feet wide—formed the opening of the drain of limestone ten inches square. Next year I had some Isabella cuttings given me. In the spring I set them out. I planted the vines fifteen feet apart over the drain, and as long as I know they bore large crops of fruit. There was one year the drain was stopped up, and the cellar was filled with water. We had to open

up the drain, and found the limestone rocks perfectly covered with a mat of roots. From this lesson, when I got to plant a tree or vine, I gather up all the bones, old shoes, and articles of that class, dig a hole three feet deep, and put in six inches of these bones, etc., then some soil, then more of my bones, till the hole is well filled up. I then set in my plant.

TUESDAY AFTERNOON.

Mr. T. R. Allen handed a letter to be read by the Secretary, which he had received in answer to a communication he had written him as a fruit grower of many years' experience in this market.

The letter was read and referred to the Committee on Publication.

ST. LOUIS, December 23, 1864.

T. R. Allen, Esq.:

DEAR SIR: Some attention has been paid by the society of which you are a member to the cultivation of small fruits, the importance of which cannot be too highly estimated.

The strawberry has engrossed the deliberations of numerous friends of horticulture. The success attending the cultivation of this delicious fruit has been varied in the different localities where it has been grown—influenced more or less by climate and soil, and perhaps in a greater degree by superior cultivation, together with the judicious selection of varieties well adapted to the particular localities. While only a few have been eminently successful in producing fine fruit, I believe it will be admitted that the many have failed; hence our markets are poorly supplied, at least so far as my observation extends. It is to be regretted that such a state of things as I have just indicated should exist in this age of activity and enlightened progressive improvement. We have depended perhaps too much on what superficial observers have been pleased to call our rich, inexhaustible land. Unfortunately, however, both the fertility and inexhaustibility of our country has been made to take the place and subserve the purpose of thorough culture, therefore meager crops have been the result. There is nothing intricate involved in the cultivation of the fruit now under consideration. A few plain, practical hints and directions, if followed, will remove every difficulty, and render what has proved a failure a complete success.

To insure large fruit, with remunerative crops, a previous prepara-

tion of the land must be had commensurate with the results to be anticipated. Superficial agriculture and horticulture are the bane of this country. The time has now arrived when some positive improvements will or must be developed. The first requisite for a good crop is fertile land, well prepared. If the land is not rich enough, then such fertilizers as are required must be added. I propose to prepare one or more acres of suitable land as follows: Trench three feet deep; set out healthy, well grown plants in June or September, eighteen inches between the rows and eight inches in the rows. There must be no failures; every plant must be there. The ground must be kept clean and in the most complete condition until fall, so that these plants will be strong and healthy. Before winter sets in the ground must be mulched all over four inches deep. This mulching answers several important purposes, all indispensable in their several places and relations. The complete protection of the plant against the rigors of our severe and changeable winters is secured; and second, mulching protects the plants against our severe periodical drouths and dry, parching atmosphere; it also prevents the rains from carrying away our light surface soil, and making a deposit of our fertilizers in the true delta of the Mississippi. Further, and a very important consideration to the cultivator is, this mulching prevents the growth of weeds. When the plant begins to start in the spring, if the mulching is too much of an obstacle for the buds to force their way through, then it will be important to remove the material from off the center of the plant, in order to let the buds grow free from obstruction. All the runners must be cut off; each bunch or separate plant will produce a full crop of large fruit. If all the suggestions be attended to, as here proposed, and you plant the best known variety for market, you can grow two thousand dollars on one acre.

The material for mulching is abundant in our country, and therefore there cannot be any valid excuse for neglecting what is of vital importance in consummating the object contemplated. If you are in close proximity to the city, you can procure all the old spent tan, and all the spent manure from the white lead manufactory. Either of these kinds of mulching will be free from seeds. Our forests furnish ample resources in tree leaves; therefore, as I have stated, there can be no excuse for the want of the material to mulch with.

If profit is the primary object, then adopt my plan, as the preparation of the land will bear only a small proportion of the expense compared to the product. You will realize double as much, and frequently fourfold for large as for small fruit.

All other small fruits grown or indigenous to this climate, will succeed equally as well as the favorite fruit of which we have been treating, provided the soil has been prepared as proposed for the first named. The currant requires a moist soil. This we can only have by deep cultivation and thorough manuring, with occasional irrigation during our dry season. The raspberry, gooseberry, and several varie-

ties of the blackberry ripen in succession and prolong the fruit season for months, thus not only making the business immensely remunerative to the producer, but also a source of infinite pleasure and happiness to the consumer.

The grape has received the fostering care and attention of the Horticultural Society, and must continue to share largely in its enlightened deliberations. The grape as a table fruit has no superior, if equal, and can be kept in great perfection through the winter. The pure juice of the grape might take the place of coffee and tea on our tables, much to the promotion of health, and as a beverage more desirable to drink. The use of our native wines would ultimately be instrumental in promoting temperance, as the people would dispense with the abominable habit of drinking strong alcoholic stimulants. The large production of an article, if it contains any merit worthy of consideration, does inaugurate consumption commensurate with the amount produced, and therefore no fears need be entertained of overstocking the market with small fruits. Our cities and towns have increased in population so fast that we find the price of fruits enhanced beyond anything current at a former period of our country. The beneficient Creator of the universe has furnished fruit in infinite and inexhaustible variety, and yet we find degraded man expending untold millions on the most nauseous of all plants, and indulging in its use to such an extent that they become objects of loathing and disgust to decent and refined people. I congratulate the Horticultural Society and the country on what progress has been made in the noble cause in which you have been engaged, and I hope and trust that you will continue to be animated by an increased zeal in the laudable enterprise in which you are enlisted, and that both agricultural and horticultural science shall be promoted by your praiseworthy labors.

I am, dear sir, your much obliged and obedient servant,

WALLACE SIGERSON.

Mr. R. S. Elliott: The plan of Mr. Sigerson requires much labor. I got one hundred and seventy-five dollars from about one-fourth of an acre, getting from one dollar and twenty-five cents to sixty cents a gallon for them. I plowed from eight to nine inches deep; planted two and a half feet apart, and one foot apart in the row. They had a slight covering in the winter. I think the reason they turned out so well was most in the picking. They were picked by the family. None were picked unless fully ripe, and few were less than from five-eighths to three-quarters of an inch, and presented a very fine and uniform appearance. From my experience in this piece, I would plant strawberries in squares, three feet apart, like corn; run the cultivator both ways; when the plants run and fill the ground one way, run the cultivator only one way. We must use the cultivator in this manner, if land does not cost more than from three hundred to five hundred dollars per acre. My plants were Wilson's Albany. When some of my

friends bought the fruit they were delighted with the large size and sweetness, and could not use the Wilson's Albany they had been in the habit of getting in the market. Four or five years ago I set out plants eighteen inches by nine; had them very carefully cleaned; no runners were allowed until fall; they were not covered in the winter; the large plants were killed, but the runners bore fruit. If these plants had been covered they would have done much better. This set me to thinking. My plants had put out fifty to sixty runners during the season, which had been cut off. This was a great effort on the part of the plant, for as fast as a set of runners were taken off another set were put out. Set the plants wide apart, cultivate with the horse and weed and thin the plants by hand. It is an important point to settle in our management of strawberry plantations, whether the plant does not hurt itself more, by cutting off the runners, in its constant efforts to put them out afresh, than by allowing them to run, and then thin them out so as to prevent crowding.

Mr. N. J. Colman: I concur in these views. I did not hear the whole of this communication, but would not like it to go out from this society as a pattern to the whole country. The plan of Mr. Knox, of Pittsburg, is being set up as a model for the whole country, but there are great controlling circumstances that will always influence the kind of culture and its amount. Mr. Knox lives near a great manufacturing city, where the great bulk of the employment is in iron and coal, and other branches adapted to men only, which concentrates large numbers of women and children, who have no regular employment, and are easily available for the vineyard and strawberry plantation, and their labor is cheap. This is not the case with us, and it is folly for us to imitate his culture where we cannot command his laborers. We have to plant so as to work most with the cultivator, and but little with the hoe. Set the plants eighteen inches apart, and cultivate one way. The Wilson's Albany is the one for profit in market. When it is well ripened it is good dark colored, rich. Some people have not patience to let it ripen. It has character; Triumphe de Grand has no character.

Mr. R. S. Elliott: I learned some items in regard to strawberries. I had "Cutter's seedling," said to be superior to "Wilson." This I discovered was much owing to the size. The "Wilson" was too large to put comfortably into the mouth, and you have to crowd it down without being able to recognize the flavor; but cut it in two and it is delicious. And when I could only get eighty cents for "Cutter," I got one dollar and twenty-five cents for "Wilson." Let every berry be ripe before being gathered.

Mr. J. M. Jordan: It is said that the flavoring material is in the rind of the berry, and that the wild berries in the woods derive their piquancy from the tannic acid derived from the forest leaves, and cultivators have thought that they found much benefit in the use of tanbark as a mulch, and watering with tanbark water.

Dr. Clagett: I think there are three important points in Mr. S.'s communication: First, the proper preparation of the soil; second, keeping the plants apart; third, mulching. It does not matter whether labor is high or cheap. The results are the same as to profit. The more labor expended the better the results produced. If a man expend as much labor and produce as much from a quarter of an acre as his neighbor from a whole acre, the balance is much in his favor. Deep culture and keeping down the runners will bring their reward.

Mr. N. J. Colman: I wish to remark that "crinoline help" is not the kind I want in my strawberry plantation. Their clothes destroy as many berries as they pick.

Dr. Miner: I wish to know the best way to mulch with forest leaves. I can get them put on, but cannot keep them there.

Dr. Clagett: Straw or corn stalks with the leaves do well.

Secretary: A few pieces of light brush keep the leaves and encourage more to come.

Dr. Miner: I once tried to keep down the runners, and cut them off every time they struck out. The crowns finally died.

Mr. B. Smith: Wilson's Albany is apt to kill out in winter, unless mulched. I find prairie grass a good mulch. It packs down easily. Keep off the runners, and you make bigger plants and berries.

Dr. Clagett: After the first year, if the ground is mulched, but few runners will take root. As soon as the runners take root, the mother plant ceases to grow, and the ground gets filled with small plants, and the fruit is not so good.

Mr. N. J. Colman: I don't think the position correct, that when the plant sends out runners it ceases to grow. I have had plants send out runners and make a dozen of plants, and still the mother plant grew as large as a hat.

R. S. Elliott: It is a question with me whether the plant does not exhaust itself more in the constant effort to make runners, when they are always cut off, than in perfecting a few runner plants.

Mr. Stewart: My experience confirms the opinions of Dr. Clagett. Any person can demonstrate that the mother plant ceases to grow, so that at the end of the season it is difficult to distinguish which is the mother plant.

N. J. Colman: The difficulty is, the plants get too thick in the ground.

Dr. Long: A plant making runners will not make so much fruit.

Dr. Hull took the same view.

It was, on motion,

Resolved, That no person shall speak longer than ten minutes, nor more than twice on the same subject, without the consent of the Chair.

It was, on motion,

Resolved, That the hours of meeting during this session be 9 o'clock, A. M., 2 o'clock, P. M., and 7 o'clock in the evening.

An essay was then read by Dr. Long, on the keeping of fruit in the winter, and, on motion, referred to the Committee on Publication.

ARRANGEMENTS FOR KEEPING WINTER APPLES AND PEARS.

Many experiments have been made for securing apples, etc., for family and market use during the interim from the late fall operations of harvesting the crop of winter fruit, to the season when the first ripening trees shall produce their welcome bounty. Burying apples in the earth has been the resort of man, for all time, for aught I know, for securing apples for the spring use, and it is better than not to make any effort for this purpose; but there are absolute objections to this mode: 1st. They become impregnated with the odor of the earth in which they are buried. 2d. They keep but a short time after being exposed to the atmosphere; and, 3d. It is extremely difficult to adjust the covering to the approved degree of temperature, and the fruit perishes either by warmth or by freezing. The method of keeping by packing in dry material has some advantages, and for small quantities it may be advised as a good method. I have had some experience with using dry sand, filling the receptacle with apples, and pouring in the sand till the fruit is covered; also, by putting them in layer by layer. This article is objected to on account of the grit that attaches to the fruit, and also, that when an apple rots the sand becomes wet and imparts its moisture to other apples; you cannot discover what is going on, and when the anxious expectants are ready for a fine treat, they behold nothing but decay; if, however, the experiment is carried on in a cold place, the fruit will be taken out in good condition. Cut straw or other forage matter, when becoming moist, heats, and is objectionable for the purposes of keeping fruit. Sawdust has been used by many persons, and the first trial that we know of, it was by this essayist. Before the experiments with this material were concluded, dry, moist and wet sawdust were respectively tried; the two latter did very well, and kept the fruit full and plump when in a cold situation, but the dry material shriveled the fruit; in all of the trials the fruit became tainted with the odor of the material, diminishing the excellence of it, and consequently creating an objection. Sawdust as it comes from green oak logs I prefer, when using this material. I think the tannic acid has something to do in preserving from decay when packed in it. The packages should not be large, as there would be danger of heating; set them in a cold place, but not where they will freeze. Freezing solid, and then storing in a close room in casks, or laying them upon rails and covering deep with straw, has its advantages. I have opened barrels on the first of May, and found the fruit thawed out and as sound as when it was put in, but it rots very soon after exposure.

If, at any time during the frozen state, the cask is opened and the thawing is suddenly or in a few days effected, it will be all lost; it must be allowed to stand at rest and thaw gradually.

My present method of keeping fruit, and the one I prefer to all others that I have tried, is by the cellar, and this I have not yet made perfect only in part. I recommend that the cellar be made upon a ridge, or in such location that it can be drained; but if this is not possible, then make but little of it in the ground; seven feet in the clear will be high enough for apples, and of such other dimensions as are necessary to receive the crop. Make stone or brick walls, of sufficient strength and thickness, to the frost line or nearly to the common surface of the ground; from this line carry up two walls to the desired height, which should be not less than two feet above the level of the earth when all is completed, leaving a space of at least four inches between the walls—ten would be better; clear this space of mortar or anything else that has dropped into it, and fill it full of beaten charcoal; cover it over with short plank, crossing the walls which lay in mortar, then cover these with a thorough coating of mortar, and lay upon them other plank lengthwise, facing on the inside with the inner face of the inside wall, and wide enough to lay at least three or four inches upon the outer wall; the joist of the floor above, if any, can rest upon this plank; the windows should be of size in proportion to the cellar; the sash hung with bolts at the top edge, and adjusted to the inside of the frame; a screen of wire webbing should be put into the frame outside of the window, and outside of this a plank for a blind, that the cellar may be darkened or the frost prevented entering by the window at pleasure; each apartment should have a flue, extending to the top of the chimney or other egress, which should be provided with a shutter of some kind to close it up when necessary. The walls should be pointed or dashed and leveled down with a plasterer's brush, which is much better; the bottom to be plastered with good hydraulic cement, at least three-fourths of an inch thick, and the whole space divided into apartments of convenient size, running to the wall at one end or side, and to a passage-way on the other; the door from the outside to open into the end of this passage. The next operation is to make berths for the fruit; get two by four and one by eight inch lumber, cut a tenon on the lower end of the stiles, and mortice the ground piece four inches from each end, to receive the tenons of the stiles; the stiles should reach to the joists above, and the ground pieces of length necessary for the width of the berth, thickness of the stiles and four inches at each end. At the distance of twenty-two inches above the ground piece, frame in a one by eight inch bar, cutting a shoulder of one inch on the under side, and again, twenty-two inches above this, another bar; three of these frames are needed for a berth; additional bearings should be put under each berth at equal distances from these frames.

Circumstances, yet to be noted, will dictate a variation of the distance the berths should be from each other, and not that they should be exactly twenty-two inches. A floor, side and end boards are next in order, and when put in place, the berth may be filled with apples,

and when this is filled, lay up another berth, and so on till the three are filled. When one apartment of the cellar is filled up in this way, close it up tight, excepting the flue, for the day-time, but at night open the window and door, and let in the cool air; so proceed with each apartment till the fruit is all put up for the winter. Berths may vary in depth according to the varieties of apples; they must not be laid so deep as to overcome their permanent elasticity, for this would produce premature decay. Newtown Pippins will bear eighteen inches, if maturing late, twenty-two inches; Pryor's Red the same; Winesap twenty-four inches; Rawle's Genitan the same; Milam and Small Romanite (Gilpin) twenty-eight inches, and other varities according to their capacity for resisting pressure. All having been done in good order, the careful attention of the proprietor is directed to a few important suggestions:

1st. The windows and shutters should be kept closed by day-time as long as warm weather continues.

2d. Both windows and shutters to be opened at night to admit the cold air, and closed early in the morning; the flue will create sufficient circulation of air through the cellar without opening the doors.

3d. The cold air may be let in the cellar in the winter, till the thermometer shall indicate the freezing point, near the windows. If kept at this temperature the fruit will remain perfect for a long season.

4th. Pack apples for market at any time, by doing the work in the passage and opening but one apartment at a time.

5th. Never open the outer door of the cellar, or a window, on a rainy day, as the damp air will rush in and the moisture be condensed on the apples; neither open doors of the apartments on a warm day, while the outer door is open.

6th. Never pick out apples till you are ready to market them. It would be well for those whose fruit cellar is beneath the rooms in which they live, to ceil or plaster, so as to prevent the warmth from the temperature above passing down. This is the method I would advise you all to pursue till you find a more perfect way.

BENJ. F. LONG.

Dr. Long: It would please me much to have the experience of others on this subject; I have had about thirty-three years' experience in Illinois. The Newtown Pippin will keep good till May. In May and June I market a great deal, and have shipped right on till August. The lower the temperature, they keep the longer. My cellar is mouse proof; if a rat does get in I never rest till he is caught. Keep the temperature low all the time—begin it low. Darkness prevents the small flies entering; I think these flies hasten the decay of the apple.

N. J. Colman: It is important to pick the fruit just in time. I think we wait too long to keep it in the best condition. We know that a pear is better and keeps longer by being picked before being quite

ripe. Captain Blossom had to pick his apples early, as they were being stolen, and they are keeping better than those of any one else.

Dr. Spaulding: There is a point of science that will illustrate this topic. One of the best evidences we have of the ripening of fruit is in its color. It is a settled point among pomologists, that all the elements of light are used in the elaboration of the juices, and that fruit secluded from the light colors better than it would do in it. It is so with pears, and the same is true in regard to apples.

Dr. Miner: I don't wish to take issue on these points as to the light, but have been making observations upon such matters. I had a grandfather who lived till he was ninety four. He was an apple man and had a cellar; it was in Egyptian darkness, and he was always famous among us children for having plenty of rotten apples, and his neighbors said that, see him when you would, he was always eating rotten apples. This set me against a dark cellar. (In answer to question.) I don't think it was ventilated at all. An uncle of mine built up an apple cellar. He had four windows of double glass on each side, and I never saw a better cellar to keep apples. He maintained a temperature from 38° to 40°.

Mr. Long: The idea of Mr. Colman is worthy of much consideration. The keeping quality of fruit is much increased by being picked in the proper time. Some years ago I picked all my Red Junes at the same time. I put the green ones by themselves in a barrel; forgot them till the twenty-fourth of August, and there was not a dozen of rotten ones, and the color was beautiful.

TUESDAY EVENING.

An essay, "The Progress of American Grape Culture," was read by Mr. George Husmann, and was, on motion, referred for publication.

ESSAY.

Mr. President, and Gentlemen of the Missouri State Horticultural Society:

In addressing you to-day, I beg leave to follow an illustrious example, and tell a story first.

Once upon a time, the legend tells us, Hleif Ericsson left the coast of Norway with a bold crew of Normans, to return to Greenland, where his father, Eric the Red, had founded a colony. But when they had been at sea several days, a tremendous storm arose, whose wild fury made the waves swell mountain high, and threatened to destroy the frail vessel. And the storm continued for seven days and increased

in fury, so that even the stoutest heart quaked with fear, and they believed that their hour was come, and then drifted along at the mercy of wind and wave, far out of their course. Only Hleif, who had been converted to Christ our Lord, stood calmly at the helm and did not fear, but called on Him who had walked the water and quieted the billows, with firm faith that He also had power to deliver them if they but trusted in Him. And, behold! while he still spoke to them of the wonderful deeds of the Lord, the clouds cleared away, the storm lulled, and after a few hours the sea calmed and rocked the tired and exhausted men in a deep and calm sleep. And when they awoke the next morning they could hardly trust their eyes. A beautiful country lay before them—green hills covered with beautiful forests, and a majestic stream rolled its billows into the ocean, and they cast the anchor and thanked the Lord who had delivered them from sure death. A beautiful country it seemed, full of game, and birds with beautiful plumage; and when they went ashore they could not resist the temptation to explore it. Among them was a lad from the Rhine, Tyoker, by name, who, when the others returned after several hours, was missing. They waited for him awhile, and then began to fear that some mishap had befallen him, for they all loved the boy, who had often told them long stories of the beautiful vine-clad hills of his fatherland; and they went to seek him. They found him on a hill beneath a tree, over which a mighty grape vine had spread itself, and he had fallen asleep with his hands full of the purple clusters, and a happy smile on his lips. When they awoke him, he said: "Oh, why did you awake me? I was so happy! I dreamt that I was at home again, far away on the Rhine, gathering the purple grapes with my dear father and sisters. And see, here are grapes as beautiful as any which grow on our hills! Oh, let me stay here, this is so like home!" But they would not listen to him, but brought him back to the vessel, and they also brought the grapes with them. And they staid there a good while gathering grapes, of which they found an abundance; killing the fleet deer and bear and buffalo; and if they had not had their families at home they would have remained. And Hleif Ericsson called the land Wineland.

So far the tradition. It is said that "coming events cast their shadows before them." If this is so, may we not recognize one of these shadows in this old Norman legend of events which transpired more than a thousand years ago? Is it not the foreshadowing of the destiny of this great continent to become, in truth and verity, a Wineland? Let us take a glance at the first commencement of grape culture in this country, and see what the progress has been.

From the very first settlement of America, the vine seems to have attracted the attention of the colonists, and it is said that as early as 1564, wine was made from the native grape in Florida. The earliest attempt to establish a vineyard in the British North American colonies was by the London Company, in Virginia, about the year 1620, and by

1630 the prospects seem to have been fair enough to warrant the importation of several French vine dressers, who, it is said, ruined them by bad treatment. Wine was also made in Virginia in 1647, and in 1651 premiums were offered for its production. Beverly even mentions, that prior to 1722 there were vineyards in that colony, producing seven hundred and fifty gallons per year. In 1664, Colonel Richard Nicholls, Governor of New York, granted to Paul Richards a privilege of making and selling wine free of all duty, he having been the first to enter upon the cultivation of the vine on a large scale. Beauchamp Plantagenet, in his Description of the Province of New Albion, published in London in 1648, states that the English settlers in Uvedale, now Delaware, had vines running on mulberry and sassafras trees, and enumerates four kinds of grapes, namely, Thoulouse Muscat, sweet scented; Great Fox, and thick grape, after five months being boiled and salted and well fined, is a strong red Xeres; the third, a light claret; the fourth, a white grape, creeps on the land, makes a pure gold-colored wine. Tennis Pale, the Frenchman, of these four made eight sorts of excellent wine; and of the Muscat, acute boiled, that the second draught will intoxicate after being four months old; and here may be gathered and made two hundred tuns in the vintage month, and replanted will mend. In 1683, William Penn attempted to establish a vineyard near Philadelphia, but without success. After some years, however, Mr. Tasker, of Maryland, and Mr. Antil, of Shrewsburg, N. J., seem to have succeeded to a certain extent. It seems, however, from an article which Mr. Antil wrote of the cultivation of the grape and manufacture of wine, that he cultivated only foreign varieties.

In 1769 the French settlers in Illinois made one hundred and ten hogsheads of strong wine from native grapes. At Harmony, near Pittsburgh, a vineyard of ten acres was planted and cultivated by Frederick Rapp and his associates from Germany; and they continued to cultivate the grapes and silk after their removal to another Harmony, in Indiana. In 1790, a Swiss colony was founded, and a fund of ten thousand dollars raised in Jessamine county, Kentucky, for the purpose of establishing a vineyard, but failed, as they attempted to raise the foreign wine. In 1801, they removed to a spot which they called Vevay, in Switzerland county, Indiana, on the Ohio, forty-five miles below Cincinnati. Here they planted native wines, especially the Cape, or Schuylkill Muscadell, and met with better success. But after about forty years' experience, they seem to have been discouraged, and their vineyards have now almost disappeared.

These were the first crude experiments in grape culture, and from some cause or another, they seem not to have been encouraging enough to warrant their continuation. But a new impetus was given to this branch of industry by the introduction of the Catawba, by Major Adham, of Georgetown, D. C., who thought by so doing he conferred a greater benefit upon the nation than he would have done had he paid the national debt. It seems to have been planted on a large

scale, at first by Nicholas Longworth, near Cincinnati, whom we may justly call one of the founders of American grape culture. He adopted the system of leasing to poor Germans small parcels of unimproved lands, to plant with vines, and give them a share—one-half, I believe—of the proceeds. It was his ambition to make the Ohio the Rhine of America, and he has certainly done a good deal to effect it. In 1858, the whole number of acres planted in grapes around Cincinnati, was estimated by a committee appointed for that purpose, at twelve hundred acres, of which Mr. Longworth owned one hundred and twenty-two and a half acres, under charge of twenty-seven tenants. The annual produce was estimated by the committee at not less than two hundred and forty thousand gallons, worth about as many dollars then. We may safely estimate the number of acres in cultivation there now at two thousand. Among the principal grape growers there, I will mention Messrs. Robert Buchanan, author of an excellent work on grape culture, Mettier, Bogen, Wirk, Richfuss, Dr. Mosher, etc.

Well do I remember, when I was a boy of some fourteen years old, how often my deceased father would enter into conversation with vintners from the old country, about the feasibility of cultivating the grape in Missouri. He always contended that grapes ought to succeed well here, as the woods were full of wild grapes, some of very fair quality. They would ridicule the idea, and asserted that labor was too high here, even if wines would succeed, to make it pay; but they could not shake his belief in the ultimate success of grape culture. Poor father! he lived at least to see the first successful experiments, and none entered with more genuine zeal on the occupation than he; when an untimely death took him from his labors. Alas! if he lived now, his most sanguine hopes would be verified. I also well remember the first cultivated grape vine which produced fruit in Hermann. It was an Isabella, planted by a Mr. Fugger, on the corner of Main and Schiller streets, and trained over an arbor. It produced the first crop in 1845, nineteen years ago, and so plentifully did it bear, that several persons were encouraged by it to plant vines. In 1846, the first wine was made there, and astonished all who tried it, by its quality. The Catawba had, during that time, been imported from Cincinnati, and the first partial crop of it, in 1848, was so enormous that everybody almost commenced planting vines, and very often in unfavorable localities. This, of course, had a bad influence on as capricious a variety as the Catawba, rot and mildew appeared, and many became discouraged, because they did not realize what they had anticipated, and a number of very unfavorable seasons brought grape growing almost to a stand still. Some of our most enterprising grape growers still persevered, however, and succeeded, by careful treatment, in making even the Catawba pay very handsome returns.

It was about this time, when the attention of some of our grape growers was drawn towards a small, insignificant looking grape, which had been obtained by a Mr. Wiederspredser, from Mr. Heinrichs, who

had brought it from Cincinnati, and almost at the same time by Dr. Kehr, who had brought it with him from Virginia. The vine seemed a rough customer, and its fruit very insignificant, when compared with the Catawba; but it was soon observed that it kept its foliage bright and green, when the Catawba foliage became sickly and dropped; and, also, that no rot or mildew damaged the fruit, when that of the Catawba was nearly destroyed by it. A few tried to propagate it by cuttings, but generally failed to make it grow. They then resorted to grafting, and also layering, with much better success. After a few years, a few bottles of wine were made from it, and found to be very good; but it was at this time, when it received almost its death blow, by a very unfavorable letter from Mr. Longworth, who had been asked his opinion of it, and had pronounced it worthless. Of course, with most people, the fiat of Mr. Longworth, the father of grape culture, was conclusive evidence, and they abandoned it. Not all, however; a few persevered, your humble servant among the number, Messrs. Jacob Rommell, Poeschel, Langendoerfer and Green. We thought Mr. Longworth was human, and might be mistaken. After a few years more, wine was made from it in larger quantities, found to be very good; and now, my friends, that despised and condemned grape is the great variety for red wine; a wine equal to, if not superior, the best Burgundy and Port, a wine of which good judges in this city, heavy importers, too, of the best European wines, will tell you it has not its equal among all the foreign wines, which has saved the lives of thousands of suffering children as well as grown men and women, and, therefore, one of the greatest blessings an all-merciful God has ever bestowed upon suffering humanity. This despised grape is now the rage, and I alone have sold over thirty thousand plants of it this fall, in a few short months. Need I name it to you? It is the Norton's Virginia. Truly, "great oaks from little acorns grow;" and I make bold to prophesy here to-day, that the time is not far distant when thousands upon thousands of our hillsides will be covered with its luxurious foliage, and its purple juice become one of the exports to Europe; provided that we do not grow so fond of it ourselves that we drink it all. I hope to see the time when no man in Missouri shall be too poor to have this noble wine within his reach, if any of his family are stricken with disease; the time when none but *free* hands shall work the soil of our noble State, and we shall hear the blythe song of the vintner, where formerly the lash of the slave driver fell upon the quivering flesh of the bondsman. May it soon come.

The Concord had as small a beginning with us. In the winter of 1856 a few eyes of its wood were sent me by Mr. James G. Soulard, from Galena. I grafted them upon old vines, and one of them grew. The next year I distributed a few scions to some of our vine growers, who grafted them also. When my vine commenced to bear, I was astonished, and so was every one who saw it, at the fine quality of the fruit and the luxuriance and healthiness of the foliage; and we propa-

gated it as fast as possible. Now, scarcely eight years from the time when I received the first scions, hundreds of acres are in course of planting in our neighborhood, and one-third of an acre has produced for me the first four years from planting, in layers, cuttings and fruit, the round sum of four thousand seven hundred and eighty dollars. Its wine, if pressed as soon as the grapes are mashed, is eminently one of those which "maketh glad the heart of man," and is evidently destined to become one of the common drinks of our laboring classes. It is light, agreeable to the palate, and has a very enlivening and invigorating effect, and can be grown as cheap, and with as little labor, comparatively, as good cider. I am satisfied that an acre will, if properly cultivated, average one thousand gallons per year.

I have cited the history of these two varieties in our vicinity, merely as examples of progress. Now let us see what progress the country at large has made in grape growing during, say the last ten years. Ten years ago, I think I may safely assert that the vineyards throughout the whole country did not comprise more than two to three thousand acres. Now, I think I can safely call them over two millions of acres. Then, our whole list comprised about ten varieties, all told, of which only the Catawba and Isabella were considered worthy of general cultivation; now, we count our native varieties by the hundreds, and the Catawba and Isabella will soon be numbered among the things that have been. Public taste has become very critical, and they are laid aside in disgust, when such varieties as the Delaware, Herbemont, Clara, Allen's Hybrid, Iona and Adirondac can be had. Then, grape growing was confined to only a few small settlements; now, there is not a State in the Union, from Maine to California, but has its vineyards, and especially our Western States have entered upon a race which shall outdo the other in the good work. Our brethren in Illinois bid fair to outdo us, and vineyards spring up as if by magic, even on the prairies. Nay, grape culture bids fair to extend into Minnesota, a country which was considered too cold for almost anything except oats, pines, wolves, bears and specimens of daring humanity incased in triple wool. We begin to find out that we have varieties which stand anything, if they are only somewhat protected in winter. It was then believed that only certain favored locations and soils in each State would produce good grapes; for instance, sunny hillsides, along large streams; now we begin to find that we can grow some variety of grapes on almost any soil. One of the most flourishing small vineyards which it was the fortune of your committee to visit last fall, was on one of the islands in the Missouri river, where all the varieties planted there, some six or seven, seemed to be perfectly at home in the rich, sandy mold, where it needs no trenching to loosen the soil. Then, grape growing, with the varieties then in cultivation, was a problem yet to be solved; with the varieties now at command, it is a certainty that it is one of the most profitable branches of horticulture, paying thousands of dollars to the acre.

Then, wine went begging at one dollar per gallon; now, it sells as fast as made for from two dollars and fifty cents to five and even six dollars a gallon. Instead of the only wine then considered fit to drink, the Catawba, we number our wine producing varieties by the dozen, among the most prominent of which I may name, of varieties producing white wine, Delaware, Cassady, Rulander, Taylor and Louisiana; of light red wines, Concord, Herbemont, Devereaux; of dark red wines, Norton's Virginia, Cynthiana, Arkansas and Clinton; of sweet, spicy wines, the Cunningham; so that every palate can be suited. And California bids fair to outdo us all, for there, I am told, several kinds of wine are made from the same grape, in the same vineyard, and in fabulous quantity. To cite an example of the increase in planting: Ten years ago the whole number of grape vines sold at Hermann, in 1854, did not exceed two thousand; this year the number sold and planted of one variety, the Norton's Virginia, will be over one hundred thousand, with a demand for ten times that number, could they be had; and the whole number of plants, of all varieties, raised there, after even as hard a winter as the last, which killed nearly all the buds, will be over two millions. Yet this is but the instance of one place. Take up one of our horticultural periodicals, and nine-tenths of the advertisements will be grape vines for sale, in any quantity and at any price, from five dollars to one hundred dollars per hundred, raised North, East, South and West, and all find ready purchasers. Turn to the reading matter, and your can hardly turn over a leaf but the subject of grapes stares you in the face, with a quiet impudence which plainly says the nation is affected with grape fever; and while our readers have the grape on the brain there is no fear of overdoing. Truly, it is a contagious disease, and it is lucky that the remedy is within the reach of every one. May it spread until every one, rich or poor, throughout the land, have grapes enough to eat and wine enough to drink.

And all this has been achieved principally in the last few years, while the nation was involved in one of the most stupendous struggles the world ever saw, while its very existence was endangered and thousands upon thousands of her patriotic sons poured out their blood like water, and the husbandman left his home to fight the battles of his country. What, then, shall we become, when peace once more smiles upon our beloved country, and the thousands of brave arms, who now brandish the sword, sabre or musket, shall come home once more, and their weapons shall be turned into plowshares and their swords into pruning hooks? When thousands of strong and willing hands will clear our hillsides, and God's sun shall shine upon one great and united people, greater and more glorious than ever, because truly free. Then shall the words and the prophecy contained in the old tradition become sober truth and verity, and America will be, from the Atlantic to the Pacific, one smiling and glorious Wineland. Let us all lend a willing hand towards the fulfillment of so glorious a

destiny. Let us all labor, with hand, heart and brain, and the day will come when no one will be too poor to have the purest of all stimulants, good, cheap, native wine. Then drunkenness, now the curse of this nation, will disappear, and peace and good will towards mankind will rule our actions. And we, men of Missouri, let us remember that our noble State is destined by God Almighty to be one of the most prominent in the good work. Let those who begin to-day remember how easy their task, with the experience and achievements of others before them, compared with the labors of those who were the pioneers in the cultivation of the vine; let them work with untiring zeal, and it will not be long before the goal is reached.

Dr. Morse: I have been forcibly impressed with the importance of paying especial attention to the selection of soils and locations for vineyards. I have thought much on these questions, with special reference to grape growing upon the sandy soils in the Missouri river.

Dr. Schroder: I wish to make a few remarks upon the diseases of the grape, the "rot" and the "mildews." The French are a people of thought and intelligence and passion, and take the grape and wine from them, and you would drive them into madness and rebellion. When the rot destroyed the grapes in France, Napoleon saw this, and to save himself had to see what could be done to give them wine and make them happy; so he offered premiums for a remedy for the rot and mildews, and learned chemists in the grape countries of Europe went to work and found a remedy; and I tried it here two years ago, and found it cured the rot; and I wish some one had whipped me when I grafted the good old Catawba with something else. The rot and mildew is a disease produced by an insect, which is caused by atmospheric changes. Professors Reinbeck and ——— detected certain little insects growing upon the soft parts of the leaves and near the buds. They destroyed the epidermis of the wood, which destroyed the vital powers of the plant. They tried numerous things to get rid of these; they found in Witzenhausen there was a vineyard that came down to the macadamized road, and the dust of the road was blown upon the vines, and that from six to ten yards from the road the vines were not diseased, but were perfect, while the rest of the vineyard had the rot. So people tried this road dust in Hesse, on the Rhine and in Bavaria.

Mr. Kellerman, in studying the insect, concluded that it was an insect on the vine, the same as the itch is on man, and he tried the sulphur, and found they could not stand it, and all that was wanting was to apply it evenly and quick enough. Dr. Liebig invented a bellows with a chamber for the sulphur, and dusted the grapes, and found it a perfect remedy, and easily applied.

Dr. Siedhoff corresponded with Dr. Liebig, and tried the sulphur remedy with such success that even the foreign varieties were looking healthy and green, that he got perfectly enthusiastic about it. He wrote me that P. B. Mead prophesied that this discovery would make

a great revolution in grape culture, and the apparatus is so complete that we may sulphur an acre in a few hours.

Dr. Siedhoff dusted two hundred vines in two hours with two pounds of sulphur, and did them well. He sent to France and got a better instrument, and got one for me, so that we might have the full benefit of the discovery.

It was said that the Norton's Virginia did not rot last year. It rotted badly with me. Mr. Cobb wrote me that his Concord rotted worse than Catawba. Another, that the Delaware was as bad as the Catawba. Norton does not rot with Mr. Husmann, but it does with me, so we must watch the results. As the sulphur is the only remedy, we must try it. We can sulphur an acre twice with six pounds. If we can stop the rot and mildew, the Catawba is one of the best wine and table grapes we have, perhaps not so sweet as the Delaware or so fine as the Herbemont. It has stood the test of years, and, but for the mildew, I don't know that the Norton would be mentioned to-night.

Geo. Husmann: The question of locality is the great point in grape culture. When any one asks me what I shall plant one thousand miles from here, I don't know. You must try it. It must come to experience. If the Norton does rot with Dr. Schroder, he must try some other variety. As to having certain cures for certain diseases, I prefer having healthy varieties, and these we have in abundance. Another question: Has the Catawba so many good qualities that we still hold to it in locations where it will not succeed with such remedies as these? I think we have varieties that will do in all locations, and mature better than the Catawba, and we would still plant other varieties, even if the Catawba were not stricken by diseases, and Norton's Virginia would have been one. It has qualities that differ from the Catawba, and place it as the head of another class, and it makes a wine which brings, and will long continue to bring, double and treble the price of the Catawba.

Secretary: The sulphur remedy has been long known as a specific in the case of the fungoid disease known as mildew, and has been used in the culture under glass in Europe for many long years, and been tried on the grape here years ago. Mr. R. Eaton tried it on a vineyard under his care, and found it stopped the disease but the fruit never colored as it ought. It became sweet, but tough, and without the color or flavor. I have tried it, and found wood ashes and lime dusted well over stopped this disease and the green aphis also, without retarding the coloring of the fruit. The implement may be new by which it can be conveniently applied, but the remedy has been long known and used.

J. J. Kelley: Before making many bellows it will be well to see if it will pay to use them, and what its efiects will be upon the fruit. The growth of a fungus on the fruit in this disease was discovered in Cincinnati ten or twelve years ago.

G. Husmann: I don't wish to discourage the planting the Catawba, but I advise all to try several varieties, regardless of what is said of varieties, to prove their adaptation to their own localities.

N. J. Colman: It is important, where these good varieties grow equally well, to know which will be most profitable to cultivate. I think the Catawba requires more labor than the Concord, Norton and some other varieties, and at this time labor is of great importance in our calculations; and when it comes to profit, can we not make more dollars and cents from Concord than Catawba? Concord is more productive, more free from disease, and judges of wine affirm that its qualities are such as will bring it into demand.

Mr. Eisenmier: I sulphured some forty or fifty grapes, with a friend of mine, Mr. Engelman, who is a most scientific man, and was familiar with the European sorts and the views held by the *savans* there, and with their mode of application. We tried some fifteen to twenty pounds, and the grapes rotted as much as ever.

Dr. Spaulding: I would like to hear from Dr. Hull.

Mr. Freeman: From what I hear, the insects are not the cause of the disease, but are present consequent on an impaired or diseased condition induced by atmospheric or other causes. So the remedy seems to lie in changing the varieties or locations.

Dr. Hull: I was appointed by our State Society to examine those diseases, and found in some of my vines many small insects that fed upon the leaves, lying among the veins or ribs. They are like a louse. They lie very still, but are very active after they begin to move. Some of them were given to Professor Lovering to report upon their character. I have tried various remedies. Soap suds make them look like dead, but when they get dry they become active again. Tobacco water kills them quite dead. The Delaware and Diana were much affected. It looks like a rust on the leaf. We sometimes notice our vines grow pale, and the stalks of the fruit dry up and do not ripen, but remain of a greenish color. All our blights are the effects of a fungus that enters the pores of the leaves, causing the curl of the peach leaf and the blight in the pear. When we get rid of the idea that the sun is the cause of our diseases, we get into the way of discovering the remedy.

N. J. Colman: I think the shrinking of the grapes is caused by the rust, and then they do not ripen.

Dr. Hull: This is not always the case. Sometimes the vines are so crowded with foliage that there is no ventilation, and the grapes do not ripen.

N. J. Colman: The grapes are frequently affected by shrinking while in a green state, and there is much difference in varieties as to liability, and in some it comes early and in some late.

Dr. Hull: I have seen the leaves shrink after very warm days, and think this is sun scald.

WEDNESDAY MORNING.

The meeting was opened by prayer by the Rev. Mr. Maxwell.

The President announced the following committees:

On Fruit—Messrs. J. M. Jordan, J. H. Stewart, Jas. A. Bayles, J. A. Pettingale, W. S. Jewett and Richard Perry.

On Wine—L. D. Morse, Louis Wolff, George Husmann, Dr. H. Schroder, B. Smith, C. Eisenmier, Dr. B. F. Long and C. M. Saxton.

Mr. Saxton thanked the Society for the honor they conferred on him yesterday by electing him an honorary member, but he wanted to be a working member, and desired to be received as such.

The annual report of the Secretary was then read.

REPORT OF SECRETARY.

The annual meeting of a society stimulates its members to take a retrospective look, so as to read the lessons of the past and to return the keen eye of hope in the direction of the future.

Man has learned much, but he has yet much to learn. The past year has been one of severest trial to our State, and bearing with peculiar severity upon those interests that we, in part, represent. Not only has the awful demon of civil strife passed among us with his scathing power, destroying as he went the fruits of the toil of the husbandman and the vintner, and gathering with ruthless hand the much prized products of the orchardist; but we have had to suffer under the effects of one of the severest years, in a climatological point of view, that it has been our lot to experience in a long series of years. It is, however, a cause of unspeakable rejoicing that we have not been altogether cast down, for the spirit of genuine horticultural enterprise was never more active than during the past year. Many among us, it is true, have been forced to leave their much loved homes, and for a time seek other forms of employment, but with undiminished ardor, and still high in their hopes of the horticultural future of our State. The fact that our meetings have been from year to year increased in attendance and in interest, even during those years of fearful fratricidal conflict, shows that our Society may well be recognized as one of the fixed facts of our social life.

The action of the Society at its last annual meeting, in concert with other local societies, in sending delegates to the recent meeting of the American Pomological Society, has secured the next meeting of that indefatigable body, in 1866, to be held in St. Louis, and there is no doubt that everything will be done by this and kindred societies, as well as by the citizens of our city and State, and of our great western country, to make the meeting all that this noble guardian of national horticultural progress and the character of our Society and State demand. There is no doubt that this and kindred societies will

take early action in making the necessary arrangements to give this meeting its fullest effect.

The subject of inducing a uniform action on the part of railroad companies through the several States, to grant facilities of conveyance to and from the meetings and exhibitions of such societies, was brought before the American Pomological Society, with a view to widely extended action by local societies, so as to convince those companies how much may be done by them in opening up the whole country to improvement, and how directly it would benefit the several roads.

The noble hospitality of our city hotels in the aid they extend towards giving effect to our efforts in the path of progress, is an example that is eminently worthy of the imitation of many other cities, and in this case, as in all others, where open hearted hospitality and benevolent action is needed, the appeal is never made in vain.

Another pleasing proof of the determined energy of the horticultural spirit of our State, is afforded in the fact that while the devastation of war, the severity of winter, the rigor of summer, have all alike borne heavily upon our people, cutting off the fruits of their labor, and vastly enhancing the cost of all the necessaries of life—while periodical literature, as it necessarily must, feels the shock the earliest and with the greatest severity, and hundreds of newspapers and other periodicals have sunk under the weight of their and our calamities—the *Agriculturist*, published in our State, has been brought out as a fortnightly, in the place of a monthly, and the friends of the culture of our soil, especially in our rural districts, should avail themselves of its information, and make it represent their interests and their wants to the full; and we hope that, before this year draws to a close, it will justify being changed to a weekly, and from the *Rural World* and *Valley Farmer* to the *Rural Missourian* and *Valley Farmer*. When we aid the circulation of such publications, we open the path to community of thought and unity of action, which are the sure precursors of genuine progress.

We call attention to a typographical error that has crept into the copy of the constitution of our society, as published with the proceedings of last year, where, on page one hundred and forty-three, section sixteen, it is said that the "annual meetings of the society will be held in St. Louis." While the experience of the past years has shown the wisdom of meeting in St. Louis, still no action of the society has rendered that a part of the constitution. Attention is called to this fact, not with a view of attempting at this time a change of the place of meeting, but to call attention to an error that has a tendency to give too much of a merely local character to our society, which has been formed and maintained with a specific view to make it the direct representative and exponent of the entire State, and, indirectly, of much of the surrounding country; and, thereby, having a greater claim on the fostering care of our government, and a deeper

seat in the affections of our people. All of which is respectfully submitted.

An essay on our native flowers was then read by John H. Tice, and referred for publication.

OUR NATIVE WILD FLOWERS.

"Full many a flower is born to blush unseen,
And waste its fragrance on the desert air."

I wish to enter a plea for the wild flowers of America, a plea to have their merits appreciated for adorning our homes, and a plea for rescuing them from destruction before it is too late. Many localities in the older States, and even many in the new ones of the West, where once the choicest wild flowers abounded and bloomed in the wildest profusion, are now destitute of them. Not even a trace of them is to be found, they having as completely disappeared before the onward march of the white man as the red man has, whose war path they decorated, and whose wilderness home they enameled from time immemorial. The work of destruction is still going on. Year by year they are crowded into narrower limits, and unless the rescuing hand is soon put forth, they, like the red man, their companion through the indefinite past, will live only in story and in song. It is true a few have been rescued, and now form our choicest floral treasures, among which may be named two varieties of Ipomopsis (*Gillia coronopifolia* and G. *aggregata*), Phlox Drummundii and Coreopis or Calliopsis *tinctoria*. But these and most other native flowers we cultivate, have come to us from Europe, where they have been carried by botanical explorers, and where they have excited the wonder and admiration of those of cultivated floral taste and of connoisseurs of floral beauty. They could not be received into good society at home before they had received aristocratic indorsement abroad. Slow as we have been to find out their merits and acknowledge their respectability, we now make amends by displaying them in the most conspicuous places in our gardens, and feel disappointed if our friends do not compliment us for our taste in selecting and displaying them.

This is only additional evidence of how slow and how long we are in arriving at any truth. The world is a mystery to us—a riddle that puzzles us for a solution. Confronted by this mystery, we yet feel a consciousness that it is our prerogative to know, and that we possess a faculty by which we can know. But instead of exercising this faculty, and, by patient investigation, discrimination and comparison, discovering the truth, we set up the phantasms of the imagination for it. For a time, at least, we accept these phantasms as satisfactory solutions of the mysteries of nature. Large experience and closer observation overturn these, often in spite of ourselves; but we again set others equally as absurd as those they supplant. Thus we grope

through life without seeing the light of truth, and die before we have entered the vestibule of the temple of knowledge. Thus, trifling with the things that affect our well-being and happiness, and neglecting the duties we owe to ourselves and our race, we remain unenlightened by the wisdom of the great volume of nature spread open before us. To some unfortunately constituted minds there possibly may be no mystery. The fact that the world exists, solves to them every question of its origin, purpose and destiny. They are not troubled by any teleological questions, nor by those of cause and effect, absolute and relative, limited and unlimited. Such minds, however, are few in number. The greater portion of mankind solve, satisfactorily to themselves at least, the great problems of the universe. They make, however, too often the fatal mistake of accepting the solutions of others, instead of working them out for themselves. The solutions of others are well enough, if we, by investigation, verify them; rejecting those that will not pass the ordeal of close scrutiny. We must always be able to give an account to ourselves and to others of the reasons for the solutions we have accepted, whether original or not. This requires a comprehensive knowledge of the subject matter, and precise and definite forms in our terms and ideas. This implies not only knowledge with the parts, but a comprehension of the functions that the parts perform in the whole. But few attain this high standpoint. Whenever a question occurs, involving the truth of an adopted theory, the great majority are unable to render a rational account for the crude notions they have accepted for knowledge. As this is so on all subjects, it is not to be expected that questions related to botany will be an exception. The child solves for itself the mystery of the flower garden by fancying that the fringes of the rosy morning cloud have descended and settled on the leaves of the plants. When this theory is no longer satisfactory to it, then it fancies that Eve, on her expulsion from the garden, carried the flowers with her. Many people never rise above this childish conception. Flowers they associate with a garden, and regard all gardens as lineal descendants of the primitive one, and, therefore, their contents as derived from it. The association certainly is beautiful, and seems calculated to induce everybody to create around their dwellings little miniature Edens. This is not all; the idea is suggestive. We are told there were none to till the ground, and the Mighty One created man. To induce him to perform his mission of terra culture, he planted for him a garden. "And the Lord planted a garden eastward, in Eden, and there he put the man that he had formed." It requires no great powers of imagination nor stretch of fancy to conceive this garden embellished with every floral treasure under the sun, and, therefore, as a sequence, that our flowers, as our race, are outcasts from Paradise, their original habitat. I would not, if I could, break up such beautiful associations; but I would extend the limits of their application. The world is the Lord's garden, planted everywhere by Him with flowers, from the

torrid heat of the equator to the frigid zones. Wherever vegetation springs and man can live, there his abode is cheered, enlivened and decorated with flowers adapted to the climate and locality they are intended to inhabit.

All flowers were, therefore, originally wild, in some parts of the globe. Some of them have been so greatly improved and changed by cultivation that their genera and species are only recognizable by professed florists and botanists. These are called "florists' flowers." No genera from any part of the world have shown such great susceptibility of improvement as some of the American genera. Take, for instance, the dahlia, originally a single-rayed, yellow-flowered rough plant from Mexico, now transformed by the art of florists into the most beautiful double flower, displaying every variety, tint and shade of color excepting blue. Another and a more recent instance is the transformation of another rough single-rayed Mexican plant in the double zinnia, now becoming a general favorite in our gardens. The innumerable varieties of Rhododendrons that constitute the most attractive gems of European gardens and conservatories, were produced by improving the originals, or by hybrids from the American Rhododendrons *maximum* and R. *Catawbiense*.

It is to be regretted that the Americans have not yet a cultivated floral taste sufficient to appreciate these, the most beautiful of our native flowers. If the domestication of some of our native species has transformed them into choicest floral gems of world-wide reputation, what treasures are yet in store amongst our neglected wild plants to reward the future labors of the florist and botanist?

Search, then, among our much abused and neglected wild flowers, and you may find treasures that will reward you a thousandfold for all your labor. If you fail, you will yet find ample compensation for all your pains in the new scope it will give to your thoughts. Your labor will become a labor of love, and before you are aware, it will open up hitherto sealed fountains of enjoyment and pleasure, unknown and undreamed of pleasures—that will improve you physically, morally and intellectually.

In an essay it is only possible to describe a tithe of the native flowers worthy of attention that are springing up around us everywhere. Even in these, with the greater part, the mere naming of them must suffice. In making out the following list I have only named such as occurred to me at the time, and no doubt have passed over others equally as worthy of attention.

First on the list stands the Hepatica triloba, because it is the harbinger of Flora's train announcing her advent, often appearing beside a lingering snow bank. This elegant plant is widely diffused over the continent. It have seen it from Canada to Georgia, and west to Wisconsin and Iowa. Flowers, pale blue, violet, white and sometimes flesh-colored. In cultivation it becomes double. I have seen them double in the bluff ravines of Iowa.

Jeffersonia *Diphllya* is found in our woods. It has a long white flower, beautiful but ephemeral. Its root is esteemed as an antispasmodic, and is used by simplers as a cure for rheumatism. It is amongst our earliest spring flowers, preceding by a few days the *Dielytra* or *Dicentra cucularia* (or Dutchman's breeches). This is a beautiful plant of white and violet flowers, with yellow summits. It is really elegant, of feathery leaves, and when it blooms looks somewhat like a hyacinth; abundant on the hillsides of St. Louis county.

Dielytra *eximia* is found from New York to North Carolina, and Nootka Sound, of purple flowers and sometimes cultivated. Beautiful.

Dielytra *formosa.* Found in the mountains from New York to Virginia, and also on the northwest coast, in the neighborhoods of Nootka and Puget's Sounds. Flower, bright red, and somewhat resembles the Dielytra *spectabilis*, (the bleeding heart) which is a native of Siberia. Dielytra *Canadensis* resembles the D. *cucularia* in leaf, and is found from Canada to Kentucky, and west, to Kansas. Its flowers are more curious than beautiful.

The Dielytra *bracteosa* is the only remaining native of this genus. It is much smaller than the D. cucularia.

Anemone *nemorosa.* One of our earliest spring flowers, in bloom from March to June. An interesting plant, white and roseate flowers, purplish outside. In cultivation it improves in size and becomes somewhat double. Its specific name, *nemorosa*, (nobody's rose,) seems reproachfully to indicate the unmerited neglect to which it has been consigned.

Claytonias, or Spring Beauties. This is another of that class of flowers that deserve attention on account of their earliness. There are many native species of this genus. In Missouri I have only found two, the *C. Caroliniana* and *C. Virginica.* Why they, like many other plants, should be called by local names, when they spread over more than half the continent, I do not know. I have seen them from Canada to the Gulf States, and west of the Mississippi. The former, the *Caroliniana*, has white flowers, with a slight tinge of red. The Virginia Spring Beauty has rose-colored flowers, with deeper colored purplish veins.

The *Violaceæ* are represented by some fifty native varieties; most of them are desirable for their earliness.

The Viola *Arvensis*, or bicolored violet, found on the dry hills in Missouri, is really beautiful, and deserves a place with the Viola *tricolor* in our gardens; so also V. *delphinifolio* and *pedata.*

The Delphiniums, or Larkspurs, are represented by eight native species, mostly perennials. The following are those most worthy of attention.

D. Mensiesii. Native of California, Oregon and northwest coast. Flowers, large blue, with intermediate shades of white, like the *D. grandiflorum* of Siberia.

D. Elegans. A native of the United States, rarely seen wild now. This is the double larkspur of our gardens.

D. Tricorne. From Pennsylvania to Missouri, and south, to Kentucky. Beautiful blue flower. Perennial. The beautiful wild larkspur of our woods is the *D. tricorne multiflorum.* It is of easy cultivation, and when in bloom its dense raceme resembles the blue double hyacinth, only the bloom is larger.

The other native species are *D. Simplex*, *D. Exaltatum*, and *D. Urceolatum.*

The *Silene*, or Catchfly, is well represented in our native flowers, both in number and in beauty.

S. Pennsylvanica, a perennial, grows from New England to Georgia, and west, to Kentucky. Flowers, red and purple.

S. Virginica. Is found from Pennsylvania to Georgia, and west, to Missouri. Twenty-two years ago I found it growing wild in this city where Twelfth street now is. It is now scarce. I know of but one plant in the county, besides what I have in my garden. Flowers, large scarlet, and beautiful. Will form dense heads if topped in June.

S. Regia. Native from Ohio to Louisiana. A splendid plant, improves by cultivation. Flowers, very large, numerous, and of a bright scarlet.

S. Catesbeæ. The most beautiful of the species; grows from Carolina to Louisiana. Flowers, dark crimson, large, and when cultivated forms large beds, blooming nearly all summer. Mrs. Loudon confounds this species with the *S. Regia.*

S. Stellata. Indigenous from Canada to Arkansas. Plentiful in inclosed woods in St. Louis county. Petals, white fringed, delicate and beautiful.

The other native Silenes are S. Drummundii, *S. Antirrhina*, S. Rotindifolia, *S. Platypetala*, and S. Douglassii.

Of Cypripediums, or Ladies' Slipper, there are five species in the United States, which, for fragrance and beauty, are unsurpassed by any of the exotics, namely:

C. Candidum. White Ladies' Slipper, from Pennsylvania to Iowa.

C. Acaule. A beautiful plant, in shady woods, from Carolina to Arctic America. Lip purple, two inches long by one inch wide.

C. Parviflorum. The yellow Ladies' Slipper. General over the country. I have found it from the Atlantic to the Missouri, and from the Gulf to the lakes.

C. Spectabile. The showy Ladies' Slipper. A superb plant, found from Canada to Virginia, and west to Kentucky.

C. Arictinum. Ram's head Ladies' Slipper. Found only in the northern edge of the New England States.

Dodocatheon Media. The American cowslip. This plant is extensively diffused over the greater part of the Mississippi Valley. It sports considerably in the tints of its flowers, having all the intermedi-

ate shades from white to purple, all having, however, that rich center of yellow and purplish brown. It is an elegant plant and easily cultivated, requiring, however, to be taken up every third year to separate the roots, as each offshoot becomes an independent plant, and will not bloom freely when too much crowded.

RHEXIAS, or Meadow Beauties. This genus is represented by eight species in all the United States, all of which are elegant plants when in bloom, requiring a moist, peat soil, and improve greatly by cultivation. The following are the species, habitat, etc:

R. Virginica. From Massachusetts to Missouri, and south to Louisiana. Flowers large, bright purple, in corymbous cymes.

R. Mariana. New Jersey to Florida and Kentucky. Flowers from deep red to deep purple. The whole plant is hispid.

R. Cylosa, R. Serrulata, R. Glabella, R. Stricta, R. Lutea and *R. Augustifolia*, are chiefly found from North Carolina through the Gulf States. The *Augustifolia* is white; the *Lutea*, as its specific name indicates, is yellow, and the remainder are purple, of different shades.

CAMPANULA, or Bellflowers, have many native species, and some of the species several varieties. The following are the finest species:

C. Rotundifolia. Hair Bell—is a native of both the Old and New World. In America, however, it is only found wild, on damp places and rocky streams in the Northern States and Britain. Flowers generally deep blue.

C. Illinoiensis. Illinois Bellflower. Illinois and Missouri. Corolla large, flat; color, light blue.

C. Aparinoides. Prickly Bellflower: from Canada to Georgia, and west to Iowa and Missouri. Flower small, white.

C. Flexosa. North Carolina to Georgia, and west to Kentucky and Tennessee—on mountains. Flowers blue, panicled.

C. Americana. From New York west to Missouri. Flowers blue, flat.

C. Glomerata. Clustered Bellflower. Common in gardens, sporting numerous varieties, from intense violet blue to pale purple. Found wild in some of the Northeastern States, but as it is a native of Europe, probably not indigenous.

C. Planiflora. Near Hudson's Bay. Blue—in cultivation.

C. Divaricata. On mountains in Virginia, North Carolina, Kentucky and Tennessee. Corolla azure blue.

C. Algida. Rocky Mountains to Alaska—plant three to six inches high, with a large, terminal blue flower.

MERTENSIA. The American species of this beautiful genus are numerous, all remarkable for their graceful, blue flowers, which are mostly of a copperish hue before expansion. The following are the principal native species:

M. Pulmonarioides. (*Pulmonaria Virginica* of some authors—Lungwort.) New York to Georgia and over all the West and South-

western States. Carolla beautiful blue. Peduncles terminal and from the axils of the upper leaves. A variety of this species is white.

M. Marginata. Upper Missouri river. Corolla blue—somewhat resembling the last named species.

M. Denticulata. Canada and New York, also of Siberia. Corolla pale blue.

M. Maritima. Sea shore Northeastern States, north to Greenland and even Iceland. In Europe, from England to Lapland—one of the few plants that are indigenous of both hemispheres. Corolla purplish blue.

The following are the other native species:

M. Pilosa, *M. Drummundii* and *M. Corymbosa.* Oregon to Behring's Straits. *M. Paniculata.* Hudson's Bay; and *M. Parviflora*, Canada and Northeastern States. Small, blue flower.

LITHOSPERMUM. This genus has many native species, but only two of which are worthy of cultivation. The *L. Canescens* (vulgarly Puccoon) is found from Canada to Alabama, and west to Missouri and Iowa; and the *L. Hirtum* is equally as extensively diffused. Flowers large, orange yellow, on a crowded raceme. Some writers call this genus Batschia.

Linaria. This genus has many representatives amongst our native plants.

L. Vulgaris is the common toad flax, found over the eastern and central parts of the United States. Flowers brilliant yellow.

L. Canadensis. Is spread over the same localities. Corolla blue.

L. Elatine. From the St. Lawrence to the Gulf of Mexico. Corolla yellow, upper lip bright, purple beneath. A variety has purple flowers. Most of the varieties of Linaria are common to both the Old and New Continent, and it is a disputed point whether they are natives here or have been introduced.

AQUILEGIA. This genus has but one native representative, the beautiful *Aquilegia Canadensis*, or wild columbine, found from Canada to the Gulf States.

ASCLEPIAS. This genus has many native varieties; the most beautiful, however, and worthy of universal cultivation, is the *Asclepias Tuberosa.* It is almost equal in beauty to the *A. Curasavica*, from South America, and is a much freer bloomer.

PHLOX. The Phloxes are the most beautiful and ornamental plants of this continent. We cannot describe all the species; a mere enumeration must suffice, viz: P. paniculata, acuminata, maculata, Carolina, glaberima, reptans, divaricata, pilosa, bifida, subulata, Drummundii, together with many other varieties. All are showy, but for delicacy of tint, variety of colors, etc., the P. Drummundii stands without a rival.

PENSTEMON is another numerous family. They are found from the Atlantic to the Pacific. The *P. Speciosus*, of Oregon, is the most showy native species.

AMARYLLIS has but one native species as far as I know, the A. Atamasco, or Atamasco Lily.

LILIUM. This genus has several fine species, *L. Canadense*, *L. Philadelphicum* and *L. Superbum*, or Turk's Cap, which are found abundantly in the woods of Missouri, are the most beautiful.

DRYTHRONIUM, or Dogtooth Violet, has three species in Missouri, the yellow, red and white; there is also a purple sub-variety. The difficulty in their cultivation is they have an inclination to exhaust themselves by forming new bulbs, consequently are not free bloomers.

SHRUBS AND ORNAMENTAL TREES. These are so numerous that I will not undertake to describe them, merely giving the botanical and common names of a few of them, viz:

Cornus, Dogwood; *Chinanthus*, Fringe Tree; *Callacanthus*, Sweet Shrub; *Amelanchier*, Service Berry; *Cercis*, Judas Tree; *Cerasus Borealis*, Rocky Mountain Cherry; *Kalmia*, Mountain Laurel or Calico Buch; and *Ilex*, the Holly, both evergreen and deciduous.

VINES AND CLIMBERS. These also are too numerous to mention. The most ornamental are the *Tecoma*, *Clematis*, *Wistaria*, *Passiflora*, *Lonicera*, *Ampelopsis*, *Celastus Scandens*, *Solanum Dulcamara*, etc.

There are many EVERGREENS besides the *Kalmia*, (already mentioned,) which latter embraces three species, *K. Latifolia*, *K. Augustafolia* and *K. Glauca*.

Amongst these evergreens the humble *Epigea repens* must not be overlooked. The common name is the Trailing Arbutus. It is not only exceedingly elegant, but when in bloom is transcendently beautiful, and the most fragrant amongst flowers.

The *Chimaphila Umbellata*, (Pipsissiwa) a beautiful evergreen from New England to Ohio, deserves attention. Flowers light purple, nodding.

The *Pyrolas* are also a large family of perennials. Flowers white, or white and tinged with purple, generally very fragrant.

The Rhododendrons of America, for number and beauty, are unsurpassed by those of any other part of the world. So much are they esteemed in Europe that no garden is without its American ground entirely planted with American Rhododendron, Azalea, Kalmia, etc.

The Rhododendron *maximum* is an evergreen, flower pale red, and grows from Canada to Georgia.

R. Catawbiense, also an evergreen, from Maryland to Georgia, particularly on the headwaters of the Catawba river. Flowers purple.

R. Purpureum. From Pennsylvania to Mississippi. Flowers purple.

R. Macrophyllum. Northwest coast near Puget's Sound. Flowers white.

R. Punctatum. Carolina and Georgia. Flowers pink, in umbellate corymbs.

R. Lapponicum, the Lapland Rhododendron, also grows in Arctic

America and summit of White Mountains, New Hampshire; evergreen. Flowers crimson.

R. Nudiflorum. Deciduous, improperly called *wild honeysuckle*, grows from Canada to Mississippi. In these limits on the Apalachian chain of mountains, which it inhabits throughout their length. I have seen ten distinct varieties, of purple, scarlet, pink, striped, red, white and variegated flowers in clustered racemes, appearing before the leaves, hence its specific name *nudiflorum*, naked flowered.

R. Viscosum. Flowers white and red, or variegated with these colors; very fragrant, grows in swamps or moist, shady places, from Canada to Mississippi.

R. Calendulaceum. Of this there are a great many varieties, of yellow, red, orange and copper-colored flowers. From Pennsylvania to Georgia. Some European florists consider this the handsomest shrub in America.

R. Nitidum. Flowers white, tinged with red, grows in moist mountain swamps from New York to Pennsylvania.

R. Hispidum. Flowers white, bordered with red; mountain lakes and streams from New England to Pennsylvania.

R. Bicolor. Sandy hills in Carolina and Georgia; flowers nearly white, with a deep red-colored tube.

R. Glaucum. From Maine to Virginia, in swamps of clayey soil; flowers white and very fragrant.

R. Canescens. Banks of river in lower Carolina, have also seen it on the Shenandoah, near Winchester, Virginia; flowers rose-colored.

R. Speciosum. Widely diffused in the United States, and of several varieties; flowers very showy, scarlet and orange-colored.

R. Rhodora. From New Foundland to Pennsylvania, in boggy places; flowers pale purple.

As the Rhododendron comprises the handsomest, most elegant and showey shrubs, they are well adapted for onamenting lawns and gardens. Many of them are evergreens. They generally prefer a moist soil, but all of them will grow in a sandy loam, or vegetable mold; are easily raised from seed or propagated by layers. Large quantities of seeds are annually exported to Europe, but in America they are almost entirely neglected. I am informed that they grow in the hilly parts of the State, on Current river, and have the promise of some seeds from there.

Azalea Procumbens. Grows on the Apalachian chain, from the White Mountains, in New Hampshire, to King's Mountain, on the northern border of Georgia; flowers red, rather small. Bancroft, in his inimitable description of the Cherokee country, in Northern Georgia, says, "there the rocky cliffs, rising in naked grandeur, defy the lightning, and mock the loudest peals of the thunder storm; there the gentle slopes are covered with magnolias, and flowering forest trees, decorated with roving climbers, and ring with the perpetual notes of the whipporwill; there the wholesome water gushes profusely in transpar-

ent springs; snow-white cascades glitter on the hillsides; and the rivers, shallow but pleasant to the eye, rush through the narrow vales, which the abundant strawberry crimsons, and coppices of rhododendron and flaming azalia adorn."

There is no word in our language that calls up such holy associations, or raise such tender emotions as the word home. It carries us back to the place where first we beheld the light, where first we felt the kindness and tenderness of a mother's love and of a father's assiduous care, the sheltered spot from which we first looked out upon the wide, wide world, with wonder and admiration, knowing nothing of the pitiless storms of passion and selfishness that rage there. Home, too, is the sanctuary whither, in manhood and age, we fly for recreation, meditation and reinvigoration, when worn out by care and toil of life, or discouraged by the deceitfulness and heartlessness of man.

The power that impel us to or nerves us for the conflict of life emanates from home, and so do the influences that shape and control our actions everywhere. Home contains those who sympathise with us in our troubles, partake with us griefs and adversity, and share with us our joys and prosperity. It is, therefore, a holy spot. Let it and its surroundings, then, be such as to speak to us of tranquillity, order, goodness and beauty. Embellish it with flowers, decorate it with vines and adorn it with trees. Here sow the green sward, and fringe it with patriotic colors, red, white and blue; there plant the rose, the eglantine, viburnum, syringa, Weigelia, the jessamine, honeysuckle, tacoma, clematis and wistaria. Here plant the fragrant strawberry, there the cherry, peach, apple, pear and luscious grape. Collect there whatever is pleasing to the eye or grateful to the taste, and home will be the radiating point of all influences that elevate our thoughts, refine our morals and ennoble our sentiments. Beauty is a divine instrumentality, God's chosen form of power to elevate us and bring us into communion with Him. Hence nature is full of beauty, the landscape is decorated with flowers, the old ruin is covered with ivy, and the unsightly tree is hung with festoons by the graceful vine, with an elegance and grace that man has never had the taste to imitate. He who cannot appreciate and enjoy the beauties of nature has but poor and few resources of happiness, and lacks an essential element for moral and intellectual elevation and refinement.

What means, then, can we command to adorn and render our homes attractive? Besides the taste and skill of the architect, there are many ways of embellishing them. To depreciate architectural beauty would be folly, but the sight of it is painful, instead of pleasant, if the surroundings do not correspond with it. It then shows that the owner has more money than taste, and more vanity than refinement. A home, whether it be a palatial mansion or an humble cottage, must be surrounded by flowers, trees and shrubbery to make it attractive. Trees are indispensable to set it off and make a distant view of it pleasant. They will cause it to receive the grateful admiration of the pass-

ing traveler, but not of our friends who visit us, unless the beautiful distant prospective is carried forward, fulfilling in its minutest details the expectations it raises. For cheerful influences that speak to the hearts of all there is nothing like flowers,

> Whose voiceless lips are living preachers,
> Each cup a pulpit, and each leaf a book.

They shed refining influences on ourselves and on our children, mollify and refine our manners, elevate our sentiments, and inspire us with cheerful views of life. Their cultivation is also an evidence of high civilization, a floral thermometer indicating the degree of refinement and intelligence the people have attained.

Pass through the country. Wherever you find the dwelling without an inclosure, or surrounded by a dilapidated fence, the possession of the yard in dispute between runts of pigs and mangy dogs, a mete place for the cow to ruminate, but not for the owner; enter there, and the interior of that dwelling corresponds with its exterior, each a reflex of that moral disorder, confusion and ignorance that reign in the hearts and sentiments of the occupants. On the other hand, wherever you find the white paling inclosing the spot sacred to flowers, the vase or flower spot on the gate post, trailing plants adorning and beautifying the walk, or tasteful mound or bed, and concealing blemishes, blooming plants disposed so as not only to please the eye but to load the air with their fragrance; enter there, and you will find the interior of that house to correspond with the exterior, and again both a reflex of the interior mental, moral and æsthetic order that reigns in the hearts and sway the affections and sensibilities of the proprietors. So true is it that a love of flowers is a love of beauty in detail. It is not confined to the garden; it enters the house, disposes of the interior arrangement, selects the library, and molds and controls the mental and moral character of its possessor. Early ought we to cultivate it in ourselves and in our children, so as to impress its power and influence on us and them, to sweeten our tempers, steady our waywardness, gentle our affections, and soften the harsher traits of our natural dispositions.

Every one who has experience knows that exotics are more or less uncertain, and sometimes, in seasons like the past, a total failure. Our native varieties are better adapted to withstand the vicissitudes of our climate, and but little affected either by its variableness or the extremes of its changes. They are not only surer, but many of them are without peers in the floral world. Let us pay more attention to our native flowers; let us rescue them from that destruction to which many of them are doomed with the advance of population, improve them by culture, as most of them will, and we will not only have choice flowers, but an abundance of them in such seasons like the past, when exotics fail.

REPORT.

The committee on the Treasurer's accounts, having examined the same, find them perfectly correct.

WM. T. ESSEX, *Chairman.*

Dr. Hull said he thought it important to those planting ornamental trees to know that, although the rhododendron was a native plant, still we lacked the humidity of atmosphere to grow it successfully. Here they are attacked by mildew, unless we have some special arrangements to provide humidity.

Mr. Tice said truly no garden in England would be complete without it, and it is to be regretted that it cannot be so with us.

An essay on the preparation of soil and propagating and planting of grape vines, was read by Dr. H. Schroder, of Bloomington, Illinois:

Mr. President, and Gentlemen:

You must not expect from me, a foreign born citizen, a very highly finished essay, on even so great a subject as that of grape culture. I can only tell you in simple language my observations, and how I have carried them into practice.

The main points in grapevine culture are: 1st. The location of the vineyard. 2d. Its aspect. 3d. The soil of the vineyard, and 4th. Its preparation. After these come kinds and varieties of grapes, each different, perhaps, for different aspects and different soils. Vineyards should be located, when possible, on high lands. It is not necessary to plant vineyards on hillsides only, or on hills at all, though I prefer such locations. The vicinity of stagnant ponds or narrow sloughs, should be avoided. Lands with a stiff clay surface, or with a blue clay for sub-soil, will never make good vineyard ground. It is not necessary that vineyards should always be on timber land. I have seen vineyards that were planted years ago with Concord and Catawba, on the open and unprotected prairie, and have seen that they have done well. The fruit grown on these vineyards was very fine, all large, compact bunches, having the finest bloom I ever saw. The fruit contained all the saccharine matter any could expect to find in grapes such as the Concord or the Catawba. The most favorable aspect for a vineyard is the southern, southeastern, southwestern or eastern. If on hills, and they not too high or too steep, a western, or even a northern aspect might do. I have seen Concords and Hartford Prolifics grown on northern aspects, and they have done finely. The fruit was larger and richer than either of these varieties dare to be when grown in any of the Eastern States. Even Dr. Grant, or Mr. Deliot, would have to admit that they were superior grapes. Therefore, if you have to use a western or a northern aspect, I would advise you to choose these kinds. In such a case I would advise you to run your rows north and

south, while on all other aspects I should advise the rows to be planted east and west, especially if you use trellis.

The proper preparation of the soil has always been a great item, and has frightened a good many from going into the business.

The teaching that the ground must be trenched two or three feet deep has been a great drawback to grape culture, and I say it is time to declare emphatically that it is not necessary now, particularly as "Father Abraham" is at work, and needs all our Irish laborers for "the trench and tented field."

If we had to trench all our vineyards in the old way, neither America nor any part of the great West could ever become a grape country. Whisky would never be abolished, and lager beer would predominate. "Two for five cents" would be the sign on every street corner. Therefore, I say, "forward," not only "on to Richmond," but "forward" with grape culture.

Mr. President, let me tell you that we are the pioneers of the new America. The future will point back to us and call us the civilizers of the social system of this country. Columbus brought the cross, the pilgrim fathers brought the Bible, but the emigrant, especially the German, brought the principles, basis or foundation for the social republic, and our wide-awake, big-hearted, enterprising and intelligent American born brethren have carried these ideas into practice, and have put our glorious country into such a state that she, for all future, will be the very paradise of liberty!

I am convinced that if America does not go largely into the culture of the vine and into wine making, whisky will yet make a grave for liberty, while lager beer will stand by, not guiltless in the bloody crime. Karl Heinzen, the most radical of all "radicals," truly says: "Whisky makes crude and beastly; lager beer makes only stupid; wine makes free, humane and glorious, while it elevates and enlightens man's heart."

Mr. President, let us return to our theme. Call Jacob to bring out the team with the plow, and cry for Patrick with the spade!

The land for a new vineyard should, if possible, be plowed in the fall, or if in the spring, just as soon as the ground is dry enough. To do this rightly, take a strong plow and plow as deep as you possibly can—in the same furrow follow with a deep tiller plow, putting it as deep as the horses can draw, turning the sub-soil, or at least well pulverizing it, and so go over all the land. If you have time enough, it will be better to let the land lie for a few days or weeks before laying off your rows—eight feet apart is the preferred distance. To lay off your rows and have them straight, take poles eight or ten feet long, and put them at the end of the rows—on each pole put a handkerchief, cap or a loyal, and if possible, a radical newspaper—use the poles as a guide. Then, with a good team, plow a furrow straight between the poles from one side of the vineyard to the other, changing your guide poles for each row. After making the first furrow across the field, re-

turning make another furrow two (2) feet from the first; so go up and down each row with the plow until you have thrown out a ditch, say two feet wide, along where each row of vines are to be planted. Now, take Patrick with the spade, and have him spade the ground you have so plowed, as deeply as he can. That is, have him spade the bottom of the furrow thoroughly. If you have rotten manure, ashes or compost, go along each row with your wagon or cart and throw in two or four inches of the manure into each ditch, covering the bottom well with it. Now put your plow on again, and plow so that every ditch will be filled up and a ridge formed along each row. By this plowing and spading you loosen the soil two or three feet deep. This frequent plowing thoroughly pulverizes the soil, and leaves it in a fit condition to be penetrated by the tender rootlets of the young vines. It will be seen that in preparing the ground in this way you will have an open drain on either side of each row of vines. It would be better if all these side drains could empty into an open drain of larger size, at the end or ends of these small ones—now you are ready for planting.

If you have no faithful German, go to work yourself—with a common garden hoe, make a slanting, shallow hole into your ridge, where you wish to plant the first vine. Take your vine from its water bath, in a bucket, where it should be kept until the moment before planting, or from its grouted bed, spread out the roots and cover your vine. To every vine put down a small stake three or four feet long—to this your vine is to be tied during its first year's growth—trim your vine so that you have but one eye above the ground. With your six or eight feet pole measure off your next vine and plant as before and so on until you get through your vineyard. If you have anything suitable, it would pay you to mulch your vine row. It will save you many a vine during the hot, dry days of our summers, and at the same time will enrich your ground.

You can now plow your ground between your rows, and between each row of vines plant two rows of strawberry plants—keep these plants in rows by frequently using the cultivator between the grape rows and the strawberry plant. By this you keep your strawberries within bounds, and at the same time you keep the ground around your vines in good condition. Let no weeds grow in your vineyard, nor amongst your strawberry plants. By this plan of raising strawberries, last year I sold over three thousand dollars worth from four acres of my old vineyard. These plants will pay you for all the treatment of the land as well as for the vines. It is very essential to have good, healthy vines for planting any vineyard. The most failures have been made in consequence of planting inferior plants. Many good varieties of grapes have been condemned and called "humbugs," by reason of nothing but inferior "steam plants" having been planted. Many of these new kinds have been sold at enormous prices, and have given nothing but dissatisfaction to all buyers. I have had to pay dearly for my experience in this line.

Mr. President, my experience has taught me that the very best vines, in all cases, are those raised as layers. These layers must be grown from well ripened wood from bearing vines. The next best I have found to be long cuttings, grown by proper treatment.

VINES FROM LAYERS.

These can be made by any thinking man, very readily, and one having a few good vines can soon have as many vines as he will want. If we want to see grape culture flourish we must teach people how to get good vines, and how to get them cheap.

To make layers, prepare your ground so that it will be well pulverized around the vine you wish to lay down. Under the cane you wish to lay down, dig out a slight trench with your hand, bend down the lowest cane or branch, and pin it down to the bottom of the trench. Lay your vine in, its whole length, and there let it lie until the eyes have made a growth of five or six inches, then fill up half your trench with good soil—in a week or so fill in the rest of the soil. When the young canes have made a growth of two or three feet, pinch off the ends, in order to get riper and stronger wood, and plump eyes, and then leave them to take care of themselves until fall. In the fall cut them loose from the mother vine, dig them up and cut them apart, so that you have a good cane from every shoot from the whole length of the cane you lay down.

Every such vine is worth a dozen of your steam made "single eye" plants. If your cane is seven feet long, you will have perhaps some twenty or thirty-five No. 1 layers from it. Some of my bearing vines have made me, in this way, over one hundred extra good layers. You can imagine how many you can make from an acre of, say one thousand vines.

Last year I raised, on an average, ten thousand layers to the acre, and many a finger thick of bearing layers, and many made wood enough for over a gallon of wine to each vine, and enough to make fifty superior layers.

I cannot recommend you to follow this heavy layering from your bearing vines, year after year, for you assuredly weaken your vines by so doing. Be moderate in your layers, and you will be all right.

PLANTS FROM LONG CUTTINGS.

Cut your canes in the fall, with from two to five eyes or joints each, tie them in bundles of convenient size, say from fifty to a hundred, bury them in the ground, selecting a dry place, and surrounded with a little ditch—cover well with soil, and over that put a thick covering of litter or of manure.

Before planting, have your ground well spaded, two feet deep, and enriched with rotted manure. In April begin to plant—make a straight furrow eight inches deep. If you are not on sandy ground,

and if you can get sand, it would be well to spread a little in the bottom of each furrow. Lay your cuttings slanting to the furrow, so that the upper eye is just covered with the surface soil; fill your furrow half full, treading the soil with the foot round each cutting, then fill the rest of the furrow. Make your next row about one foot from the first, and so on over the whole piece. If convenient, you had better put on a mulch of, say, two inches or so of dead leaves. This will be a great help in carrying your cuttings safely through the summer drouth, and it keeps down the weeds. If you want to make your success more certain, it will be well to give your cutting bed some sort of shelter to keep off the sun. Drive stakes into the ground, upon which lay poles, and on them trees or branches of twigs having the leaves left on them when cut green. Leave this shelter until your cuttings have made a growth of two or three inches, removing the shelter during a "cool spell," or just before a rain storm. Keep the weeds down. The dead leaf mulch should be put on in this case, and if too dry, frequent watering will pay you well. If your cuttings have been good, you should not lose more than five per cent. of them. If you plant varieties liable to mildew, I would advise you to have your shelter on until August; for shelter is often and most always a perfect preventive to mildew.

LIST OF GRAPE VINES.

I have never avoided any expense or labor for enlarging my collection of vines. Over two hundred varieties are on trial. Many of these have been proved worthless, while others are promising well. Practical knowledge and the great science of chemistry go hand in hand with me. I am about erecting, expressly for this purpose, a chemical laboratory, and hope, with the help of other chemists, to discover many more secrets for the benefit of the grape growing people. I assure my patrons that I make it a point of honor never to recommend a variety without it has had a thorough trial.

PROFITS OF GRAPE CULTURE.

Much is said on this subject, and I will add, that grape culture is the most profitable branch of horticulture, and, besides, it is a very healthy and elevating one. In Germany and France, even by uncertain crops, many a family makes a nice living by cultivating only half an acre of vines. How much more profitable it is here, where land is cheap and plenty, and where machinery and tools can be brought into the business; where "rot gut—forty rod whisky"—is over two dollars per gallon, and will be for many years, until our national debt is paid. The duty or tax on wine is only five cents per gallon, in order to encourage the culture of grapes. By planting only one thousand vines to the acre, you can raise, in the fourth year, by using ordinary plants, twenty-five pounds of grapes to the vine. By planting "old wood"

layers, you will have this amount in the third year. That makes twenty-five thousand pounds of grapes to the acre, and at ten cents per pound, you have two thousand five hundred dollars. Or if you make it into wine, at fifteen pounds of grapes to the gallon, you will have over one thousand six hundred gallons to the acre, and at one dollar and twenty-five cents per gallon, you will have two thousand dollars. But if you raise on an average only half of the above, you have one thousand dollars to the acre.

VARIETIES.

Wherever you have a good market, that will last for time to come, you had better raise table grapes, as you need no large wine cellars, presses, vats, etc., and have your money at once. But where you cannot depend alone on the market, you had better plant kinds good for wine and for the table. Where there is no market for fruit, you had better plant only wine grapes.

Wine Grapes. Norton's Virginia Seedling, Herbemont, Catawba, Clinton, Delaware, Concord. These varieties have been sufficiently tried.

Wine and Table Grapes. Delaware, Concord, Catawba, Herbemont, Diana.

Table Grapes. Hartford Prolific, Crevelling, Logan, North Carolina Seedling, Concord, Delaware, Diana, Catawba, Herbemont, if ripe, Isabella, Perkins, Elsinburgh, Rogers' Hybrids, To Kalon, Union Village.

White Table Grapes. Allen's Hybrid, Cuyahoga, Rogers' No. 1, Rebecca, Cassady, Clare, Maxatawny, Golden Clinton. The are many more worthy varieties, but I will not swell the list.

Mr. President, you now have my secrets on grape culture, and you see they are simple enough. In this business, as in all others, the principle required by one embarking, is common sense, no fear of work and unswerving perseverance. With these, any man can succeed. I trust these few disjointed remarks may encourage more than one to join us in the great work we have in hand.

Dr. Spaulding: There should be more information on the subject of summer layers. There is a vast difference in the value of spring and summer or green wood layers. Spring layers make the best growth and come earlier into bearing.

Dr. Hull: Has had some experience in the value of the several kinds of plants; a layer from the old wood becomes hardened; they are not so liable to kill out; the roots are mature and not so apt to rot off or dry up.

[NOTE.—A parcel of very fine, strong single eye plants were sent for inspection by Mr. E. Beaumont, of Bloomington, Illinois. A large box of very strong layers and some samples of what he called steam plants, very small single eye plants, which were obtained from Ohio,

and kept in a snuff box in the pocket, were exhibited by Dr. Schroder, of Bloomington, Illinois.—*Secretary.*]

Dr. Clagett: I think the difference in the value of layers is of much importance. The question of putting manure in the trenches should be considered. It has been said it is not easy to get the plants deeply rooted unless the soil is rich; and this is important in view of thorough culture, of keeping the lower soil free and permeable; of maintaining a supply of nourishment and moisture, especially in our very dry summers.

Dr. Schroder: In the commencement I was not successful with the Delaware. They were sold high, but I thought I must go into the Delaware. I called it the holy grape. I planted it, and it would not live, and it would not die. I tried it from many different growers; had them sent in letters and snuff boxes. I got a lot propagated in Ohio, in a steam factory; there I got two hundred of the *little creatures* at two dollars apiece. The propagator said, in his letter of advice, "I send No. 1, single eye plants, cut back to five eyes." I tried to count the five eyes, but could not. I got some of my friends to examine them, and try to discover the five eyes. At last I tried them with my microscope, and found three of the eyes on the shoulder at the edge of the old wood. As I cannot yet raise plants enough, I sent to Ohio and got *these* little things. (Taking two from his pocket out of a snuff box.) The roots are not ripe, and all there is to see is the steam saps. The buds are rather scales than eyes; they want development. I want to teach my friends how to make their own plants. If you examine the eyes of these layers, they are plump and good. In these steam plants they have not top enough to plant; you can plant these layers eight to nine inches deep, and still have eyes above ground, and they will root at these eyes under the ground. If you plant such Delawares as these, they will succeed. A quarter of an acre in good vines is better than an acre planted out with poor plants. I will tell you how you can raise single eye plants: cut good ripe wood into single eyes, get small glass boxes, lay them in them, keep them in the cellar till June; by that time they will look like small cabbage plants, with shoots an inch to two inches; plant them out, shade them for awhile, and you will raise plants equal to the steamers I speak off. The life is in the eye, and will come out. In plants that are difficult to root, when you go to layer them make a slit under the eye, leaving the eye on the layer piece. (Cutting a piece as an example.) They will make roots between the joints. It is found that our American grapes will not grow as deeply in the soil as the foreign sorts. While the foreign grapes are grown three feet deep, I never found a good native vine more than four to eight inches deep; there they get a supply of the electric, phosphoric fluid. The carbonic gasses we find sixteen per cent. at four inches in the ground, and only one-half per cent. at a foot. I am against the plow in the vineyard; the cultivator is like a fire, going crack, crack among the roots, and brings a bundle

of the fibres to the end of the row; but in these times we must use them when the labor is in the battle field, and I would not drink a drop of wine in my life, that we may "save the Union."

In these times our women will come and help us, and get red cheeks, and sweet countenances and healthy bodies, and they will walk so that you can hear them in the room. When they will help their husbands in the garden and the vineyard, instead of going to the dry goods stores, we will be able to cultivate with the hoe.

Dr. Edwards: I think that I have learned something in my trip this fall. I went East and visited a number of vineyards and places for propagation, and have different views of some things since I went there. There is no doubt that the layer from hard wood is best, but very good plants are raised from single eyes. Layers and single eyes from green wood are not worth anything. Such vines as Dr. Schroder shows, if they live, will take five years to bear fruit. The power of producing fruit seems destroyed by continued propagation from green wood. A good single eye makes a good vine; perhaps not so early in bearing as layers. I saw Delaware vineyards, and hear on all hands that the Delaware is improving much in vigor during the last five to seven years. I saw single eyes under glass and in the open air, and Dr. Grant had Delawares four to six feet high, one year's growth.

Mr. Stewart: Plants that Dr. Grant sent out to me were raised from green wood.

Dr. Edwards: I tested many of the new grapes, not a few berries, but as many as I could eat—the Adironac, Iona, Israella, Allen's Hybrid, and, to my taste, these four are ahead of all others in this country. There is a question as to the hardiness of the Adirondac, but it is as hardy as the Isabella. The Iona is the most delicious grape, thrifty grower, and easily propagated. These, with Allen's Hybrid, are the best I ate out of fifty varieties of which I ate plentifully. I prefer the Adironac and Iona to Black Hamburg. There is nothing better than Allen's Hybrid. Israella has not so much character, but is very sweet.

Dr. Bircher: My friend said that steam single eye plants are a humbug, but I can raise as good a plant as his from a single eye, but it takes a year longer. I make a plant the one year, take it up and cut it back, and then I can have a cane long enough to plant as deep as I want. I want to plant eighteen inches deep. We want thickness of wood, for the eye must have room to sit on the wood, or it cannot be full and plump. The man who would sell "green wood plants" is one of the most *infernal cheats on earth*, and is worse than making wooden nutmegs. I never saw one in Europe green enough to plant green wood vines. These forced vines have always a blackness at the heart. He that sells them should be taken up for obtaining money under false pretenses.

J. M. Jordan: Strawberries may succeed in a vineyard, but don't recommend them. Long cuttings are not as good as short ones. The

roots are best from the third eye, and are likely to be stronger than from each eye. By having stakes three to four feet long and keeping the vine tied up helps to ripen the wood. In propagating from green wood, and never allowing it to get into the bearing state, you change the functions of the vine from a fruit producing to a wood producing condition. Good plants can be produced from single eyes. In regard to preserving vines during the winter, it is best to cut them back and lay them down; if started near the ground the canes are easily covered. In regard to plowing the vineyard, I am glad the three feet trenches are being got over. This mode will pay if you have to replant every ten years. Trellis training has been advised, and is the cheapest and best in the vineyard. Excessive layering has ruined many a vineyard.

Dr. Spaulding: My object in trying to bring up the subject of propagation has been fulfilled. These inferior plants have been a great drawback to planting vines. Men spend much money on such plants, and become discouraged. Our friend, Dr. Edwards, compliments Dr. Grant upon his fine single eye plants. No doubt Dr. Grant knows well how to propagate single eye plants well, but he does not always send out good plants. That Dr. Grant does not regard single eye plants as being as good as layers, can be seen from his catalogue, in which he puts single eye plants at from one dollar and fifty cents to three dollars per thousand, while he offers layers at five dollars per hundred. I place much reliance on this mode of estimating their real value. In this way of forcing up single eyes you can obtain great length, but no thickness or strength. In our former meetings we have spent too much time on varieties, many of which are good for nothing, and too little attention has been given to the quality of the plants.

Jesse W. Fell: There is a point to which sufficient attention has not been directed, in order to be successful in transplanting from the green-house to the nursery rows. The condition of the plants in this state is very delicate and requires to be performed with great care. Last winter, having much of my own wood frozen, I got some wood from Mr. McWorter, of fine quality. Friend McWorter has some of the finest plants I have ever seen from single eyes, got from Dr. Grant. In propagating, I put them in the hot bed in February, and force them till May. I plant them out in May. The layer makes a stronger plant than the single eye.

Dr. Hull: The remark of Mr. Fell, that the layer makes a stronger plant than the single eye, is of much importance. (Exhibits a cane.) This cane has had a dozen or more eyes. These return the sap to the roots and the cane. The matter which forms the young shoots, which proceed from the eyes, is laid up in the eyes and the cane. These roots imbibe the moisture and dissolve the matter to supply the vine.

D. T. Jewett: The books say in planting, cut back two eyes. Would you cut that cane down to two eyes and then plant it?

———: I would plant it and leave two eyes out of the ground.

E. R. Mason: There is a question as to the propagation of varieties. It is, "what is the true mode of preparing the soil?" Dr. Schroder gives a method that is perhaps well adapted to his soil, but does not suit the hills of Missouri, and cannot be applied to our stiff clay lands around this city. I followed this shallow plan in 1860 and 1861, with seven acres, and much regret it. Deep culture is absolutely necessary to success. Much of the cutting off of the grape roots near the surface may do in theory, but will not do in practice.

I cannot with an ordinary horse team get nine inches deep. I use five yoke of oxen to get nine to twelve inches deep. The second plowing is with a sub-soil plow or lifter, a narrow plow, and can only disturb about one-third of the soil. I then plant my vineyard. This does well for a few years, but the soil washes, and unless the soil is very deep you cannot retain it without mulching. Upon my Concord vineyard I carted six inches of good soil, at much greater cost than trenching. In future, I will plant no more vines than I can trench. I trench two feet and drain, and find this remedies washing. I spade two feet with two spadings. Dr. Schroder's back plowing and ridging, etc., are open to many objections. Trenching, I find, has been much overstated, as to its cost. It can be done for less than one hundred dollars per acre at the present prices of labor. I paid sixty dollars two years ago. Dr. Schroder estimates the produce of one acre at twenty-five hundred dollars, and what better interest could be wanted than by even borrowing the hundred dollars to prepare the soil properly? Say what you will about this shallow planting, its cheapness is no reason. This idea that the roots will not go down into the soil is absurd. The roots go everywhere in search for their proper food.

WEDNESDAY AFTERNOON.

The order of business being the election of officers for the ensuing year, the President appointed Messrs. C. L. Edwards and J. A. Bayless as tellers. The following persons were declared duly elected:

President—H. T. Mudd, St. Louis.

Vice Presidents—George Husmann, Hermann, A. J. Stewart, Chillicothe, B. Smith, Cuba, Missouri; J. A. Pettingill, Bunker Hill, Dr. H. Schroder, Bloomington, Illinois.

Corresponding Secretary—R. S. Elliott, Kirkwood, St. Louis county, Missouri.

Recording Secretary—William Muir, Fox Creek Post Office, St. Louis county, Missouri.

Treasurer—John H. Tice, St. Louis, Missouri.

It was, on motion,

Resolved, That a committee of four be appointed to inquire into the propriety of memoralizing the Legislature to pass a dog law for this State.

Whereupon the President appointed Messrs. B. Smith, W. S. Jewett, William T. Essex and Dr. L. D. Morse said committee.

It was, on motion,

Resolved, That a committee of three be appointed to draft a bill for the action of the Legislature, for the protection of orchards and vineyards in the State.

Whereupon the President appointed Messrs. Williams, D. T. Jewett and N. J. Colman said committee.

PRUNING THE GRAPE.

Dr. E. S. Hull was requested to give his views upon this subject. He complied.

The first year, he remarked, after the vine is planted it is kept tied up to the stake, and is next season, if strong enough, pruned to two eyes. If not deemed sufficiently strong, it is allowed to grow a single cane for another year or more, as the case may be. These two eyes will then produce two canes, which may be either tied up to separate stakes or both to one stake. When the vine has reached the top of the stakes it can be led on a continuous bar or line along the top. In the fall or spring cut one cane down to three or four eyes, and the other to eight or ten eyes, according to the strength of the vine. This season we set three stakes, and twist the long cane spirally round the stake, and tie it firmly to the top. (Dr. Hull illustrated the whole process with vines and stakes.) This spiral twisting makes the eyes break evenly, and distributes the sap to all the eyes alike. The wood growth is then trained to the side stakes. This method has the advantage over the ordinary methods of training, that it admits the sun and air more fully. It will be understood that the action of the sun and leaves makes the fruit. By this method of staking you can move around and work among the vines better than by trellis. It prevents competition between the fruit and wood growth for the air, and keeps the foliage healthy. In answer to questions, prune from fall to spring. The growth is not too vigorous in the Concord; you have only to increase the distance. This is strong enough; one of the stakes will hold all the growth you can make.

Dr. Schroder: Those who do not know much about grapes get confused among big names. It is the easiest thing in the world to trim a vine. Plant the vine, slanting one eye out of the ground. Set a stake; train it up. I don't know if it is essential to pinch in the laterals. I don't recommend it with all varieties. The Concord, Hartford, Taylor and other rampant growers will make fruit buds on the laterals. In

breaking off the laterals leave one leaf, so that the fruit bud will not be injured. In some varieties, as the Clinton, it will cause them to bloom in June or July, and they will make fruit. For tying, gunny or coffee bags cut to pieces do well, or rye straw. Then allow them to make arms, if they are wanted. Fourteen or fifteen inches from the ground leave two good buds; rub off the others. If the arms are strong enough, cut back to two or three feet on each side. Next year, when the eyes begin to swell, leave four to six eyes, according to the size of the variety. Let these canes grow, (illustrating with a vine) the first cane cut two to three feet, next to one eye, third cut as the first, the fourth as the second, and so on. So you have two canes for wood and two for fruit. When you have fruited the cane, cut it out and fruit the others. You will have from two to three bunches of grapes to each eye. Leave two eyes and leaves above the last bunch of grapes; the last bud will break, and you can pinch again. I find two pinchings are enough for the whole season. In rampant growers leave all the laterals, and cut them leaving four to six eyes, and you get some grapes from the laterals. Some leave two canes. Cut one to four feet; bend round to a bow and tie, and cut the other to one eye. In pruning the one that bore the fruit is cut out. The summer pinching is the same. If you train them upon stakes, have another little stake to tie up to so as to bear up the grapes. If the vines are very strong you can have two bows. The best way is the arm system and trellis, but I doubt if the grapes are as good. To lay them down on the arm system, if the arms are very strong it is hard, but they can be laid back in the direction of the mode of planting. I am not in for covering with soil. There is some trouble in getting the eyes to break on the arm system. In a large vineyard you may have to tie before the eyes break. Shake the vines well and loosen the soil around the collar before laying them down, and they will bend easier; they are more flexible under the ground. If the arms are started too near the ground there is too much trouble in working among them. My trellis is upright laths.

J. M. Jordan: For tying vines prepared pawpaw bark is very good.

Dr. Long: Pawpaw bark is good, or take short pieces of rope and separate them.

G. Husmann: It has been my misfortune to be out most of this day. In listening to Dr. Schroder, as far as I can catch his meaning, he is teaching a strange doctrine. I protest against the slovenly culture of the grape. There is no fruit which pays better than this. There is no fruit that suffers more from a few days' neglect. One day's neglect in summer pruning can hardly be repaired. I don't want to see the knife used from spring to fall—all I want is the finger and thumb. Dr. Hull thinks growing the vine upon stakes is better than trellis. I use three laths and small posts, and make less shade than the stakes. I would not cultivate my vines on stakes for any consideration. I protest against the way Dr. Schroder cuts the young growth, and thus

robs the vine of too many leaves at a time. I do it when I can discover how many bunches, and nip it at the last. I pinch the laterals to one leaf. I am opposed to the bow system, because you crowd the growth of the vine and create dampness and rot. In the bow system the weight of the fruit pulls down, and the fruit and foliage becomes one mass. Is it preferable thus to crowd our growth and fruit together, or to spread it over the trellis? My vines are set with a post at each side and three wires.

The vine planted the first season makes its growth from the terminal bud. At the end of the season cut back to one or two buds. If the cane is strong enough for fruit the third season, cut say to two buds. These two buds throw out two shoots. One I destine for next season's bearing. If I grow single canes, reserving the strongest cane for fruit, cut the other to two eyes. I tie the bearing cane to the first wire and spread it slanting. The other cane will throw up two shoots. The young wood I train up by itself to give it air, summer pruning, as before described.

Next season I treat the two canes in the same manner, but if a strong grower train and leave a spur, cut the cane that has borne fruit to two eyes. I want the spur to produce wood for next season. With other varieties I find another method does better. I check the growth of the cane for next year's fruiting upon the main cane by pinching it in, for the purpose of producing strong laterals on the young cane, and produce my fruit on lateral spurs of three to four buds each, and the leading canes are trained to one side of the trellis, and after being pruned are trained to the lower wire. When we come to advocate the doctrine that men can grow grapes without attention, it will lead us out of our course. The operations are small, but must be done well and at the proper time. The more care the better it will pay, and unless gentlemen will go into grape growing with the idea they will give it care, they will fail.

As to root pruning, I would as soon think of cutting the throat of the grape as to root-prune it. I have seen it bleed to such an extent there was no further treatment needed. (Illustrates the positions of vine and trellis.) Use willow in the spring for tying; pawpaw bark in the summer. Linn bark is good, but easily torn by the friction. With wires, the tendrils are good.

WEDNESDAY EVENING.

The President introduced Professor R. F. Paddock, who delivered an interesting and instructive lecture on "The part performed by the

atmosphere in the development and growth of plants." At its close the lecturer was requested by the Society to write it out for publication with its proceedings. (Manuscript not furnished.)

Dr. Long: It gives us great pleasure to hear the labors of the early pioneers of chemistry traced up and brought home to us in the operations of our every day life, and although the alchemists did not discover the elixir of life, they opened the way for the rays of the grand discoveries of a science which has done so much to the advancement and refinement of man. We want to invite the aid of science in our inquiries, and solicit the coöperation of its noble followers in our endeavors to trace the teachings of nature in vegetable life.

Dr. Spaulding: While I agree with the lecturer in the main, there are some points on which I disagree. It is the common idea that the sun gives equal rays of heat and light, that they reach the atmosphere, and passing through it they strike the earth, and that the atmosphere receives its heat from the rays reflected by the earth. Instruments have demonstrated that there is no such thing as rays traveling. They have shown that light is only matter in motion. Heat is also another form of motion; it is not a substance. Peculiar motions produce the sensations of light and heat. I feel to take up this subject, but it is due to ourselves that some of the ideas be noticed.

W. C. Flagg moved the following resolution:

Resolved, That the Missouri State Horticultural Society, relying, as it does, on free and intelligent labor for its best success, hails with pride and satisfaction the ordinance of the convention, which to-day consecrates the vine-clad hills and orchard slopes of Missouri to the free labor of free men.

Adopted.

It was moved by Dr. Edwards,

Resolved, That the different committees on fruit arrange a list for Missouri, on the principle of the National Pomological Society, and report at next meeting.

Some discussion was had on the subject by Drs. Edwards, Hull, Guy, and Spaulding, and it was finally resolved that separate committees be appointed on the several fruits.

A report was then read from Mr. Williams, Chairman of the Committee on Peaches, and, on motion, referred for publication.

Your committee, appointed at our last meeting, to make a report on peaches, respectfully submit the following:

It was thought by most of us at our last meeting that peach trees were either killed or else so badly injured that we would be deprived of that delicious fruit for two or three years, till new orchards were planted and bore fruit, but we are happy to state that, although old orchards were injured to some extent, yet the prospect is fair for a crop of peaches this season.

Your committee has noticed the beneficial results of cutting back

heavily after the top has been injured, as was the case by the extreme cold of last winter. Some trees came under our notice last spring that were thought to be killed; were cut back within two feet of the stem, and have now fine heads, have made rapid growth, and give promise of plenty of fruit this year.

As regards the preparation of the soil for planting out a peach orchard, your committee cannot too highly recommend deep and thorough plowing before digging the holes, which should be made about four feet in diameter, and from eighteen inches to two feet deep, though we think it more important to have the holes wide than so very deep. If the soil is fresh, we do not think manure any advantage to the trees, but would fill the holes with top soil, and the growth will be as rapid as is desirable.

Stocky trees, one year old from the bud, thick in porportion to their height, are the best and make the finest trees. We would prefer them thick at the ground and tapering, and about four feet high; then cut off the tops to three feet; pare the ends of the roots smooth; cut off all bruised roots, and they are ready to set out.

To set out a tree well, it takes two persons, one to hold the tree in its place, and another to straighten out the roots and work in the dirt among them with his fingers.

After the tree commences to grow, three or four of the most vigorous shoots that are about the same hight should be selected to make the head, and all others should be rubbed off the following spring. Shorten in these branches one-half, and cut out all the shoots that grow on the inside, the object being to make all the wood on the outside, and open on the inside, making the head of the tree, as was stated by Mr. Husmann in the discussion on the peach at our last meeting, something like the shape of a kettle. We would shorten in the leading branches each year, and thin out where the shoots grow too close, and by these means secure fruit of good quality, and also bearing wood for the following year.

As to the varieties we should plant, we will say they should be selected so as to give a succession of fruits from the earliest to the latest.

Among the many varieties that are cultivated, we can recommend Troth's Early Red, Early Newington, Early York (large), Gross Mignonne, Prince's Late Red, Oldmixon, free, Ward's, free, Heath Cling and Smock, free.

W. C. Flagg: I would like to have the views of members in regard to growing the peach tree in the vase form. It is said to insure the early decay of the tree.

Dr. Spaulding: I planted out my youngest trees and trained them in this form, and they have been all broken down.

Mr. Davis: I have some four hundred to five hundred trees trained in this form and they have done well. Their limbs are shortened in. I would treat them in this manner to prevent them breaking down.

Mr. Riehl: I think it the best plan to have an open head; it makes the best fruit. I think that the difficulty of breaking down arises from the incomplete union that is formed with the stem of the tree in the enlarging of the branches. And when the shoots are young they make the strongest union.

E. R. Mason: I got a lot of trees in such bad condition I had to cut them back and set low heads. I have not lost one by breaking, and many of them bore fruit.

Dr. Miner: I plant the trees and have a bud to grow up to a single stem. Next year I cut it to two or two and a half feet. It will then throw out lateral limbs. I was always taught to avoid crotches. I leave a number of good buds to form a head at as nearly as possible equal distances round the stem, and thin out some of the lateral growth if too close.

Dr. Hull: If I understand, the difficulty is in the crowding of the limbs till they lack room. I obviate this by making vertical stems, and maintain the laterals in a great degree.

Dr. Spaulding: The natural form of the tree is a pyramidal one. It must have room.

Dr. Hull: I keep a good round head, and regularly cut out the shoots to renew it. I find this renewing gives immense peaches. I may notice, in regard to the report just read, that the Mignonne named there is the old Early York; the real Mignonne is a foreign variety and worthless.

Dr. Long: I have seen many peach orchards, but none like Dr. Hull's. I don't know any man that excels him in the size and color of the peach.

Dr. Hull: I adopt and carry out the idea to have no two leaves grow where only one will properly mature. I don't try to feed ten pigs at a trough where only five can get at it. I keep the fruit very evenly distributed over the tree. I prune from the first warm weather in spring till along in June or July, when a change takes place, which is indicated by the stocking of the fruit. The limb has the material in it, in the sap, that will make the growth till a certain point, when it makes its terminal bud; and while it is making fruit it is also making fruit buds for the next year. Sometimes a tree will grow well and bloom fully, but have no fruit; the trouble was it grew too rapidly and did not perfect the fruit buds. I stimulate as highly as possible, but try to cut out all that will interfere with the formation of fruit buds. I prune till June, when the juices become too dense and the tendency to wood growth is checked, and the matter is sent into the fruit buds and fruit, and develops them.

THURSDAY MORNING.

The meeting was opened by prayer by the Rev. Mr. Dunlap.

The Committee of Reception reported the following delegates from other societies:

Indiana State Horticultural Society—John C. Teas, Walter G. Stevens.

Illinois State Horticultural Society—Dr. B. F. Long, Dr. E. S. Hull, W. C. Flagg, Jonathan Huggins, J. W. Fell, Dr. H. Schroder, K. H. Fell, J. H. Stewart, A. S. Reefield, C. R. Overman.

Alton Horticultural Society—Dr. E. S. Hull, E. A. Riehl, Jona. Huggins, W. C. Flagg, Dr. B. F. Long.

A report on pear blight was read by Dr. H. Clagett, and referred for publication.

REPORT OF THE COMMITTEE ON PEAR BLIGHT.

MR. PRESIDENT: It is with no small degree of diffidence that the Committee on Pear Blight have undertaken to perform the duties assigned it. This subject has engaged the attention of many of the ablest horticulturists in different parts of our country, without success. One cause after another has been assigned to its production, but each in its turn has been abandoned, until there is an extensively pervading opinion that the cause is undiscoverable. Indeed, so strongly is the horticultural mind drifting to that conclusion, that it is doubtful if the cause were really discovered whether it would be relieved for years to come.

In such case we might well shrink from the task, and were it not for the reflection that many of the discoveries that now bless mankind were made during the present century, we might abandon the investigation in despair.

It is not to present any new discoveries of causes that we venture to offer a report, but rather to present the result of our investigations into the operation of causes heretofore believed to exist, to keep alive the investigation and to encourage a more general and closer study of the laws regulating vegetable life and development; for in doing so our labor may not be lost. Even though we fail to discover the cause of or a remedy for blight, we may discover something equally or even more valuable.

The alchemists failed to discover the means of transmuting the baser metals into gold, but in their search laid the foundation of our present valuable science of chemistry. So we, in searching for the cause of pear blight, if we study the laws by which vegetable life is sustained and opposing influences, may contribute something toward establishing the art of horticulture upon a scientific basis.

In the investigation of this subject our attention is first naturally drawn to the effects, and from them to trace back their operation to

an adequate cause. In doing so it is important to determine whether it is a cause acting directly or remotely. Without a careful examination of all the facts, we are liable to be led astray as to the original cause, for we often find that effects which appear to manifest themselves suddenly are to be ascribed to causes existing long anterior to any noticeable effects. In a large majority of cases it will be found that the seeds of disease had been sown long before its development is observed. Indeed, in most cases, it is only discovered in the last stages, and in many not until death of the affected part has ensued. We, therefore, should not despair of discovering the cause, because a few years of investigation of so complicated a subject has left it in obscurity, especially when we consider that a knowledge of the laws controlling vegetable life and development is yet in its infancy.

Among the various manifestations of disease in our pear trees, it is perhaps not definitely determined what forms of disease may properly be called blight, or to what extent different forms of disease may be ascribed to one common cause. We have, therefore, directed our investigations to diseases of the pear tree, without regard to name.

The first remarkable thing that attracts our attention is, that our most thrifty trees are most liable to disease. In most cases it appears to originate in the bark, destroying to a greater or less extent its vitality. In some cases it is confined to the outer strata, in others extending to the liber. It may commence in the roots, trunk or branches, still its general character is the same, differing rather in locality and degree than in kind. We do not propose to go farther into detail of particular cases than is necessary to elucidate the principles involved. Three years ago we had a Flemish Beauty on a quince stalk that had been remarkably thrifty; seven years after planting it bore a heavy crop of very fine fruit; the first indication of disease was its dropping its leaves in the fall earlier than usual, and on examination we found the roots dead and partially decayed, and the trunk dead a foot above the ground, and no other indications of disease. This tree put out leaves the next spring about the size of a finger nail, and withered up.

The next year, early in June, we found a Belle Lucrative and two Vicars of Winkfield (all on the quince, and previously very thrifty), with an iron rust-colored sap oozing out of the bark, two or three feet above the ground; in a few weeks the entire trunk and lower portion of some of the branches were dry and cracked open; the remaining portions of the Vicars died in the course of the summer. The top of the Belle Lucrative matured its fruit of unusual size, and remained alive to the close of the season.

In many cases the disease for a time affects only the outer bark, appearing all around the trunk, and sometimes in spots, and sometimes around the middle of a branch, extending to the alburnum, and producing entire death of the part affected, while above and below the parts remain for months apparently healthy. In other cases, the

disease ascends or descends, rapidly destroying the life of the entire branch.

Last summer, in the latter part of July, we found three young pear trees with the leaves suddenly withered up, and the bark beginning to wither; on examination, we found the roots had evidently been dead all summer, and no other indications of disease. These trees had made quite as much longitudinal growth of the branches as any of the surrounding trees, but less stocky, proving conclusively that this growth was made from material assimilated and stored in the tissues of the tree the previous year, for while the dead roots absorbed and sent up the necessary amount of water for a time, it was impossible for them to have furnished any other elements from the soil. Had not the season been so extremely dry, the tops of these trees might have retained their vitality to the close of the year, as others have done.

How far these different forms of disease may be ascribed to the same cause, we may not yet be able to determine with certainty. But there are good reasons for believing that much the largest portion may be ascribed to the effects of the frost, resulting in some cases from imperfectly matured sap, in others from warm weather in winter, accompanied with moisture, changing its condition, followed by severe freezing.

To appreciate the effects of these influences, we must turn our attention to the changes that take place in the condition of the sap (which is the life of the tree).

At the close of the growing season, if the leaves have completed their work, there should be stored up in the tissues of the tree, from each bud to the extremity of every root, perfectly matured sap, sufficient for the reorganization of the tree, with new roots and leaves. It should be of like character with the material stored up in the seeds, and fitted to pass the rigors of winter uninjured, for every bud is an embryo tree, as much so as a seed, and requires to be supplied with nourishment fitted for its development.

Now, as the elements taken from the earth by the roots must combine with the elements from the air in the leaves, and there be assimilated, vitalized and concentrated; if, then, by our mode of cultivation, or the peculiarity of the season, the roots continue to send up materials from the earth late in the season, and the leaves, from any cause, fail to complete their part of the work, the sap, which should have been perfected, will be in the condition of unripe corn when the blades have been overtaken by the frost, or grapes when the leaves have been broken off by unskillful vine dressers, or destroyed by insects; the fruit cannot mature, or the seed produce a healthy vine.

But suppose the sap has been perfected, and a spell of warm, moist weather occurs in winter, changing the gluten, sugar and starch into vegetable albumen, or partially change it (which must take place

before growth can commence), followed by severe freezing, it would be liable to suffer injury or death, depending upon the extent of the change in its condition, and the severity of the cold following.

It will be perceived that, upon this hypothesis, a disease to be produced by frost does not depend so much upon the degree of cold as upon the condition in which the cold finds the tree. Owing to peculiar circumstances or conditions, the effects may be greater on one part of the tree than on another, and thereby locate the disease sometimes on one part and, in other cases, on another, and in different degrees of intensity. Sometimes the outer bark is only affected; if that is removed at the proper time, new bark will be replaced and the health of the tree restored; but if vegetable, it becomes dry, hard and unyielding, preventing the return of the assimilated sap to the roots, and they perish for the want of nourishment, and the tree is lost.

When the disease has destroyed the vitality of the liber on any part of the tree, amputation is the only remedy, and the sooner it is performed the better, taking care to cut below all indications of disease. But as prevention is better than remedy, as fruit grows we should direct our management to secure exemption from the cause of blight. All the facts appear to indicate that this can be done to a considerable extent, in proportion as we, by our mode of cultivation, obtain perfect maturity of the sap at the close of the growing season.

Dr. Hull and some others believe they have secured this maturity, and thereby exemption from blight, by root pruning. It is doubtless adapted to secure these ends, and where trees have made luxuriant growth and remain barren, it is adapted to bring them into bearing; and, in highly cultivated gardens, may often be practiced with advantage. But when we consider that the larger portion of our trees come into bearing quite early enough for their ultimate usefulness, it becomes a question whether the practice of root pruning should be generally adapted in orchard cultivation, or confined to particular cases. We should consider how far it may be economy to stimulate the growth by high cultivation to an excess of luxuriance, to be afterwards reined up and brought into subjection by root pruning. The nature of the case would seem to indicate that it is a practice to be resorted to rather to correct previous errors than a coöperation with natural laws, for if the tree had not been previously stimulated to an excess of growth, it would not require such extraordinary curbing to reduce it to a natural pace.

We may sometimes obtain temporary advantage at the expense of greater future usefulness; but the nearer we bring our practice into conformity with nature, the more certain will be our ultimate success. We should, therefore, be careful not to adopt for the normal condition a practice required to correct an unnatural tendency resulting from a previous departure from natural laws, but rather seek to bring our general practice into conformity therewith.

Mr. Douglas believes that he has to a great extent obtained exemption from root blight by winter mulching. This practice appears to be in harmony with nature and adapted to secure the end proposed. The leaves through which life was imparted to the tree in summer, naturally fall to the ground in autumn, and may properly serve as a protection to the life imparted from the vicissitudes of winter, and where they are insufficient, other substitutes may be supplied with advantage.

In regard to varieties most exempt from blight, experience proves that the native variety of inferior quality are almost if not entirely exempt, and should, therefore, be selected to graft the best varieties on for standard trees. My next neighbor has a dozen or more large old trees that bear annually large crops of inferior fruit; from their appearance they may be forty or fifty years old. For the last ten years that I have observed them, they have been free from blight; they have evidently not been pampered by high cultivation; the finest varieties appear to be most liable to blight, and high feeding, as in animals, seems to increase their tendency to disease. But we do not mean to be understood as favoring the abandonment of the finer varieties, or of starving them by neglect, for we shall continue to plant the best varieties, and give them as good cultivation as is compatible with a healthy growth and perfect maturity. We would rather lose the half or even two-thirds of our trees, and have the remainder bear fruit of the best quality, than cultivate inferior kinds.

We do not doubt but that there are other causes of pear blight; many suppose it to be caused by a peculiar state of the atmosphere. This may in some cases tend to develop into greater activity a preëxisting disease; but it is scarcely probable that a cause so general in its character would produce effects so partial, without the coöperation of preëxisting causes. Others attribute it to minute insects, sometimes found preying on the bark, but it is questionable whether this, too, may not rather be the effect of existing disease than the original cause; judging from analogy, the former appears most probable. How far we are correct in our conclusions we leave to be determined by future experience.

All of which is respectfully submitted.

H. CLAGETT, *Chairman.*

Dr. Clagett: It is a fact capable of the most exact demonstration that the buds and all along the stem of the plant, the sap is treasured up, and in spring begins to move in every part. Thus we find, as is the case here, (in a large branch of a pear tree with green wood at the top and a large piece of wood and bark dead and blackened to the center intervening) the sap performs all its functions in the development of leaves and shoots from the elements stored up in the limbs and leaves; while this portion, being perfectly dead, can add nothing to this portion, except, perhaps, moisture, and all this devel-

opment of growth has been from the elements laid up in the tree; here it is alive below, entirely dead for more than a foot, and alive above. In closely examining trees, if the bark is found slightly discolored, this indicates the presence of blight, active or only incipient, as the case may be. There is a thin bark which, if once destroyed, destroys the vitality of the tree. Where the liber is not diseased, the trees recover.

Mr. Pettingill discovered this fact, and thought he had discovered the remedy for "blight."

Dr. Long: The committee did not agree upon all the opinions in this report. We want further investigation. My view is, that this death in the pear tree has nothing to do with winter freezing. The parts of this tree have been killed by some disease as yet unknown, perhaps by the state of the atmosphere—some malaria. I contend that this disease may have been carried down by the leaves. This tallies with my experience for twenty years. In an orchard where the trees were cultivated, all are dead; there were nine trees of the same lot, never cultivated, standing in the sod, all alive and healthy but one, which was killed by accident; all are standards. I have no doubt that the course of inquiries we are now upon will do much to encourage pear growing. There are insects that prey upon the bark, which destroy or, at least, injure its vitality and induce diseases.

An essay was then read by Dr. E. S. Hull, of Alton, upon "Root Pruning and its Effects," and referred for publication.

ROOT PRUNING AND ITS EFFECTS.

In this paper we propose to describe some of the effects of root pruning; also, briefly to consider, not the cause, but a preventive of a blight in the pear tree, and hope to give such rules as will enable any person of ordinary ability to successfully grow a plot of a dozen or a thousand trees, free from that form of disease usually known as fire blight. This evil, which we propose to combat, never makes its appearance in this latitude earlier than the last of May or first of June. When it first appears it is confined to the vital portions of the bark nearest the surface, and, through the circulation of the sap, is carried both upward and downward, as well as through the bark into the alburnum. It also circulates laterally, in a short time completely encircling the tree or branch; in this condition, if the circulation in the sap wood is very active, it penetrates so deeply that all above the parts affected will wilt and die as though they had been cut off and exposed to the sun and air.

Small portions of the bark infected with this malady, on their being ingrafted into healthy plants in which the sap is in full flow, will impart the disease to the plant as effectually as though it had taken the blight in the ordinary way. When trees are attacked in which the alburnum has formed and the juices flow tardily, the poison then

dries out, leaving only a small portion of dead bark; or, if the poison reaches only to the sap wood, which sometimes occurs when the sap is only moderately active, the branch will often mature its leaves and fruit, and then die, in the same manner which one would do which had been girdled. This disease has been designated as "frozen sap blight," "sun blight," "fire blight," etc., and sanguine observers, without any definite understanding of its nature, have assigned or guessed at various causes.

Although we entertain no demonstrated views as to the cause of blight, yet we are inclined to think that at last attention has been directed in the right channel, and presume that further careful microscopical observations may prove it to be due to the action of some of those minute forms of vegetation; the sporules or seeds entering the pores of the plants, and under favorable condition, vegetate and produce that vitiated condition of the sap so destructive to our trees. It often happens that remedies for various diseases are known and successfully applied, while the cause is unknown, and when in after years it is understood, it is still found that the remedy could not be improved. So far as a knowledge of pear blight is concerned, we hold this to be precisely our position, leaving to time and others to determine whether the remedies we offer are not the best adapted to the wants of the horticulturist. In a collection of over one hundred varieties of pear trees, in which the blight was prevalent, we observed that the Sekel and other sorts which matured their growth by the end of May were exempt; we therefore concluded that those varieties which early matured their growth owed their exemption from disease to the condition the trees were in. The alburnum having formed, the further circulation was arrested, the medium through which the poison ascends became so far obstructed as to offer no channel for its dissemination. During the winter of 1849 and 1850 (the trees had been four years planted), we root-pruned a number of the sorts most liable to disease, with a view to forcing them to rest or to complete their growth by the first of June.

In this operation we cut away from one-half to two-thirds of the roots. The effect of creating so great a disproportion between the top and roots was plainly visible by the following reason: Early in the spring the growth was at first as though nothing had occurred to disturb the balance; but as growth advanced it was evident that, although the roots had collected and parted with all the moisture and ingredients necessary to healthy development, yet the interruption of the downward circulation caused the sap to be longer exposed to the action of light and heat, thus fitting it for the formation of fruit, spurs and buds. Also, the wood formed under this condition of growth was compact, close-grained and entirely free from blight. To perform this operation of root-pruning, during the winter, when the sub-soil is soft, we open a trench quite around the tree and distant from two to three feet, and with a sharp spade cut all lateral roots. The pear is a deep

feeder, sending down perpendicular roots to a great depth, from which lateral roots diverge; care must be taken to go deep enough to reach these, as before directed.

If, in the course of a year or two, the tree should require a second pruning to force it to rest by the first of June, open a circle in the manner before directed, but from six to twelve inches larger in diameter. Should additional pruning be necessary, proceed as before, enlarging the circle according to the growth and habits of the tree. Root-pruned trees are productive to an extent that will largely repay all cost and labor, and, at the same time, greatly increases size and early ripening. The first season after, Dix and other sorts, tardy in coming to bearing, will perfect an abundance of fruit spurs and buds; these will, the following year, produce full crops of fruit. Trees thus once supplied with fruit buds usually produce annually thereafter.

Standards, by root-pruning, may be rendered as dwarfish as desired. They will also be found free from the ills so common to trees dwarfed on the quince. Peach trees subjected to this operation, the winter previous to fruiting, if it be too severely performed, become permanently dwarfed, though they afterwards bear regularly full crops of fruit; but if judiciously performed it would cause the trees grown in a Northern climate to mature their growth so fully as to enable the fruit buds to withstand the cold when the mercury is fifteen or more degrees below zero. On a plum tree, three years old, the trunk one and a half inches in diameter, two years root-pruned, sixty-one plums, of the German prune variety, were matured; also, on a Columbia plum tree, five years from the bud, twelve baskets (about five bushels) were grown. The plums on all of these were the largest of their kind, of the highest color, and three to five days earlier than the same varieties grown on trees unpruned. All the trees thus overtaxed died of exhaustion. Root-pruning the cherry in a latitude so far south as this is not always advisable, as the tendency in trees so treated is to cause early maturity of wood and leaf. When trees remain too long inactive they shed their foliage, and are by the warm autumnal rains excited to make a second growth, which is suddenly checked by the cold, while the sap vessels are full of unorganized succulent matter. In this condition the severe freezing expands the juices with which the sap vessels are highly charged, separating large patches of bark, which proves so destructive. Moderate pruning of a full growing and shy bearing sort may be once performed, and it must be borne in mind that deep and constant stirring of the soil, together with a free application of soap and water to the leaves, are necessary to make them persistent. Varieties of apple, pear, plum and peach, and, in short, everything bearing fruit or seed, from a currant bush up, will become more fruitful when judiciously root-pruned. The fruit grown on such trees will, owing to its larger size, superior flavor and color, bring a much higher price in market than fruit produced on those treated in the ordinary way, while the trees will form close-grained, compact

wood, and if not overtaxed by excessive crops, will become permanently productive. Care must be taken that sufficient vigor be left in the trees to insure healthy development of leaves and fruit, and, at the same time, to perfect fruit buds for the succeeding year; for severe pruning and overcropping will make one or more seasons of rest necessary before the tree can produce a second crop. The reason of this is obvious. While the tree is ripening its fruit it is at the same time producing its embryo fruit for the coming year, which must reach a certain stage of growth on the germ which remains enveloped in its scaly covering, or it will, at most, produce only abortive flowers. There is deposited in the alburnum, during the summer, a considerable amount of sugar, which, in the spring, is dissolved by the ascending sap. This sustains the young germs until the leaves are sufficiently advanced to elaborate the food necessary for them; but when the crop is excessive, these ingredients, instead of being deposited, are principally consumed by the fruit, thus rendering abortive, from want of nourishment, the germs for the succeeding year. In this latitude we do not regard it necessary to trees grafted on the quince, nor do we know of any excuse that would justify one in using that stock when we can so easily render the pear on its own roots as dwarfish as we wish, and far more productive, and that without any of the disadvantages which attach to trees grown on the quince. Cultivators are frequently annoyed by the loss of their dwarfs. After having borne one or two crops they die the succeeding summer. This is owing mainly to the lack of affinity between the top and roots, and to the great draft on the juices in the tree. These, in the process of elaboration, instead of being returned to the roots and aiding in their formation, descend only to the point of union, where they are arrested. In this condition they are drawn to the buds and fruit to which channels are open, and in them expended. The tree is now in a condition similar to an apple tree girdled by the borers—point of union in the pear and quince—and the girdled part in the apple being covered with bark favors the ascent of moisture. This, in its passage upwards, dissolves the nutriment which was deposited in the alburnum the previous year, and carries it forward to the expanding leaves; this, with such additions as are taken from the atmosphere, undergoes a partial development, forming a few small fruits, by which time the tree is dead. This form of dissolution is at present considered by superficial horticulturists a disease of the roots; death, as they suppose, having been induced by the severe freezing to which the roots had been exposed, whereas it is due to the causes we have pointed out. Trees in which all their juices are retained in the graft are readily known by the great enlargement at the point of union. In such, when young wood is formed at all, it is only an inch or two in length, while nearly all the buds are changed from leaf into fruit buds. These are some of the phenomena which precede the supposed disease. Shortening the roots of trees in which this tendency exists would increase rather than diminish the evil, and should

not be resorted to, or, if performed at all on dwarfs, the operation should be confined to those sorts in which there appears to be that free communication between the roots and graft, and not likely to be interrupted by the maturing of a full crop of fruit.

Root-pruning has been objected to by some on the supposition that a great loss of the spongioles would be the result. We will here briefly state the condition of the roots during the year. In winter and early spring the large and small roots receive, by absorption from the earth, sufficient water for the wants of the tree during its state of rest; but when the season of growth arrives, there is formed in the bark numerous small warty excrescences, out of which new rootlets push; on these, new rootlets and other minute warty enlargements appear, to which the spongioles are attached. These latter are greatly increased during the growth of the plant, and are capable, from their peculiar formation, of receiving, in addition to water, those salts and substances necessarily derived from the earth for the well being of the plant. In the latter part of the season, or about the time the terminal buds are formed in the vertical branches, the spongioles begin to decay, and with the fall of the leaves they all perish. In this condition the roots again supply the limited amount of moisture demanded by plants in a state of rest. Now the trees may be said to be spongioleless as well as leafless; hence, no immediate loss of spongioles can result from root-pruning. This mode of pruning we have described will make the horticlturist independent of the natural tendency of certain varieties of fruit trees to produce alternate crops, or to remain a long time in an unfruitful condition, since, by enlarging or diminishing the circle, according to the habits of different sorts, he forces fruitfulness, and, at the same time, that partial degree of inactivity so essential to immunity from disease. Care, however must be exercised not to allow our trees, as in the case of the plum trees before referred to, to bear so heavily as to destroy them, or impair their future usefulness. It should also be borne in mind that mulching, or what is better, deep and repeated stirring of the soil, should not be omitted during the season of growth.

Dr. Spaulding: There are points in this essay new to me. The facts that the spongioles decay as the leaves fall, and that they hold the same relation to the roots as the leaves do to the branches, are of much importance. This system illustrates the necessity of maintaining a perfect balance between the top and roots. This system will do away with the necessity of dwarfing the pear on the quince. This method of dwarfing the pear on its own roots introduces a new era in pear culture, and I think this will be found one of the most important documents in our proceedings.

Dr. Hull: I was struck with the similarity of views held by Dr. Clagett in his report and myself.

(In answer to questions.) The disease originates in the bark, never in the leaves. In this case there is always a very slight discoloration

of the bark. The disease is developed in from three to five days after inoculation. The disease in the dwarf pear commences in the roots. The sap is locked up in the tree, and needs nothing but moisture. This is demonstrated in this way: Persons having glass structures have planted the roots in an outside border, and led the vines into the house. These have started and formed grapes one-third the natural size, while the roots outside were dormant.

The sap in the dwarf pear descends to the point of union, and from the channels being partially obstructed, the roots are robbed of vitality. People upon examining the roots find them injured, the roots having died for want of the proper support, and suppose it arose from freezing in the winter. The sap vessels are much larger in the pear than the quince. All our cultivated sorts are considered artificial varieties, and produce long, succulent growth, and root pruning forces a compact growth, and prevents a long continuance of growth. If pruned now, it will not give a crop this year. It requires a year to perfect the fruit buds for the fruit the year following.

Dr. Clagett: I am glad to find that we agree precisely upon the prevention of disease in the pear, and so far upon the causes. I visited Dr. Long's orchards; in both the aspect was southward. The trees that fared to much better than the others were more protected from the rays of the sun at noon and afternoon. I do not consider it an established fact that this disease is always caused in that way, but we find that in orchards on the northwest aspect, where the sun strikes upon the trees with full force, there are always marks of injury on that side; and we find that, our most powerful winds prevailing from that side, cause the trees to lean in the opposite direction, and thus take away from the stem the shade and protection that is afforded by the head. This is true of the apple and other trees, as well as the pear. Thus they are liable to suffer from the heat in summer and freezing and thawing in winter.

It does not depend so much upon the degree of cold to which the tree is exposed as to the condition of the tree. If the winter is mild and the trees have imperfectly matured wood we will have blight. It will be seen that upon this point Dr. Hull perfectly agrees. We must know more upon the circulation of the sap, etc., before we can arrive at definite results.

Dr. Schroder: In many places in Europe where I have been we have very changeable weather—frost by the 12th of September—still pears are raised in such quantities that they are sold at twenty-five cents a bushel, while apples bring seventy-five cents. I think the pear blight is caused by insects. In corresponding with some of the most intelligent men in Europe, I find that they have the same opinion. They think that the insect makes his home in the ground; in the spring they climb up into the trees, where they lodge and deposit their eggs. In the blight the bark is always spotted, and in these spots I think with a glass I discover the marks of the insects. I think sulphur might be

tried with good effect. Root pruning may be very good, but I doubt it much. I think we are too lazy to do this. In the treatment of human diseases I am against bleeding, and I am against cutting off the roots. Our friend in Rock Island takes the same view of pear blight, tracing it to insects.

Dr. Spaulding: It is important to find out the cause of blight. This has long been tried without any definite results; but a more important point is the remedy, and this is given by Dr. Hull, and this can at once be tried by this Society. As to the labor, it is but little, and Dr. Hull, after long trial of it, says we get three hundred per cent. upon the labor expended. The markets of the West are but poorly supplied with good pears; this need no longer be the case.

Dr. Hull: I may remark that it may be well to appoint a committee to give this subject their fullest attention.

It was, on motion,

Resolved, That a committee be appointed to give the subject of pear blight their fullest attention, and that Drs. Spaulding, Engelman and Hull form said committee.

Mr. Fell: What is considered in Great Britain the cause?

Dr. Hull: I don't at present recollect the details, but it is found by microscopic botanists that the seeds or spores of a fungus enter into the circulation, and that a certain condition of the plants afford the conditions necessary to their active development.

Jesse K. Fell: I have about one hundred dwarf pears. They have been somewhat neglected since early last season. They matured their wood very early, and had no blight. Some of the trees have borne profusely, though not all. This the first crop of fruit.

N. J. Colman: I have been cultivating the dwarf pear for eight or ten years; have three hundred to four hundred trees, and I believe have had better success than most of those who have grown dwarf pears. The ground is good, strong soil, underlaid by heavy clay. I prepared by trenching three spades deep. The trees did not come into bearing as early as I expected, and up to this time have not been so productive as I anticipated. It is with a tree as with an animal, bad to have too early bearing before the constitution is fully formed. Having prepared the ground thoroughly, have done but little since in the way of cultivation, and out of from three hundred to four hundred trees have only lost six or eight. Stirring the soil late in the season causes a growth of unripe wood.

H. M. Thompson: It seems to me that no one has yet reached the real point of difficulty in pear culture. Mr. Colman thinks it is in the preparation of the soil, and other gentlemen trace it to other causes. I think it more a chemical question—is more intimately connected with the elements of the soil than with its culture. On the sea shore by Cape May there are still strong, healthy pear trees that were bearing when I was a boy. There the soil is silicious; here it is clay, or vegetable mould. In examining the roots of trees we find that this

class of soils give too rapid growth, and is too retentive of moisture, and under-draining is indicated as being, if not a remedy, at least an aid.

Dr. Long: In the case of the nine trees of which I spoke, most of the soil was very pure sand.

Mr. Watson: In 1835 and 1840, I planted a lot of pears and cherries. The cherries all died, and all of my pears, save two, one a Bartlett, the other a Seckel. I turned them out and they have borne very well. I do not know that it would be safe to try this extensively. This was on Missouri bottom land.

Jonathan Huggins: I have tried to keep minutes of a small lot of dwarf pears, a portion of my orchard; it is eighty by one hundred and forty-four feet. The soil is drained and spaded to the depth of two feet, as in ordinary trenching. This was done in the winter of 1859; on this was carried three inches of coarse sand, and planted two hundred and twenty trees on the land, giving them clean culture with the hoe and spade; of a portion of these I am making minutes. Had no trees injured in 1864; realized one hundred and forty dollars from the fruit; have had no blight; promises well for fruit next year; ground faces to the west. I will report progress on this from time to time.

Mr. J. M. Jordan presented a large number of fruit gatherers to the Society, and illustrated the mode of using them.

Dr. Spaulding: I want to inform the members that Mr. C. M. Saxton takes subscriptions for the "*Horticulturist*," and some other similar publications, at club rates.

President Mudd announced he had a club list for the "*Country Gentleman*."

Mr. C. M. Saxton: I am not in that business as a business, but will forward subscriptions with pleasure, without any idea of pecuniary profit.

Mr. N. J. Colman recommended the extensive circulation of horticultural literature, as the best means of advancing horticultural progress. He had always recommended the literature of other States as one of the best modes of making us acquainted with the requirements of our own State.

R. S. Elliott: I want to call attention to the agricultural journal of our own State. I think every member should have it first, and if he can take another then he can choose among a large list of excellent publications of other States. The members of this Society should make this journal the medium of communicating with the rest of the country their views and experiments, and not go to Eastern papers with their communications.

Mr. Thompson: I was engaged in the sewer pipe and drain tile works at Joliet, and having sold out my interest there, intend opening another factory of the same character near this city, and have received considerable encouragement from members of this Society; drainage goes hand in hand with thorough cultivation. I cannot yet

state the cost of tile, but will supply them at the very lowest rates. I have obtained a place on Tyon avenue and Pacific Railroad.

Dr. Spaulding: This subject would be taken up with zeal by the members. We had all felt the want of drain tile here.

Dr. Hull made a verbal report from the Committee on Railroad Facilities; had corresponded with several societies, but their annual meetings having only recently been held, no other action had taken place.

Dr. Spaulding made a verbal report from Committee on Exhibitions. The crops of fruit in the West did not justify holding any such exhibition last season.

A report on entomology was read by John H. Tice, and referred.

REPORT OF COMMITTEE ON ENTOMOLOGY.

The Committee on Entomology beg leave to make the following report:

The past season has been a high carnival for all manner of insects. Fields, gardens, orchards, meadows and vineyards have suffered more than ever known in this region. It may have been on account of the drouth, which always is favorable to the multiplication of insects, or it may have been by their natural increase. If the latter, it presents an alarming state of things. Grains, grapes, flowers, plants, vines and trees are all defoliated, and the fruit nearly all destroyed, or so much damaged as to be in a measure worthless. In Missouri, we have never had any laws to protect insectivorous birds, but these are mercilessly destroyed by wanton boys and stupid sportsmen. It is time that the Legislature of this State adopt some legislative measures to abate this nuisance.

In the remarks we wish to submit, we call especial attention to the insects inimical to the grape vine. One species of these insects, at least, is new in this section of country, but all show a rapid and destructive increase. The insects most troublesome to the vine the last season, were the *Tettigonia vitis*, thrip or vine hopper, which is very destructive to the foliage. Its exact origin we have been unable to ascertain, but it passes through several stages before the full developed insect is formed. The cast-off *exuvia*, or skins, sometimes cover the leaves of the vine like white scales. The only thing remarkable about it is that the insect, from first to last, changes its form very little. The first stage resembles the last, except that then it is minus the wings. The wings are of a transparent yellow, marked with four dark spots. When disturbed, they jump about with great activity, and when they have reached the winged state, are very annoying to any one handling the vines. They live on the under side of the leaf, in which they insert their beaks and suck the sap or juice. This causes the leaf at first to appear blotched with yellow spots, soon to wither and dry up. Fumigation with tobacco will destroy them, but

this is impracticable in vineyards. Experiments may discover a cheap and practicable remedy.

The *Desmia Maculalis*, or leaf folder, made its first appearance in the vineyards of Missouri and Illinois the last season. If its depredations last year are to be taken as a sample of its ravages, then it threatens to become the most formidable enemy the vine growers have to contend with. By the middle of August some varieties of vines were completely defoliated, and appeared as if scorched by fire. It, however, attacks almost exclusively the varieties of the *Vitis Labrusca*, one of the distinctive characters of which specie is, it has the under side of the leaf tomentose. The rigid leaved varieties of this species, Blood's Black, Sage, Northern Muscadine, etc., it avoids, because the leaves are too stiff for its operations.

The Isabella, Catawba, Rebecca, Diana, Union Village, Adirondac, Iona, in fact, all the varieties of the *Vitis Labrusca* that have flexible leaves, are subject to its ravages. The leaf of the Concord is rather too rigid for it, and, hence, in a degree it escapes sharing the fate of its congeners. The Delaware, which belongs to another species (*Vitis Estivalis*), is somewhat affected, as its leaf is not entirely glabrous. The Clinton, Taylor, Lenoir, Herbemont, and all the glabrous leaved varieties are exempt from its ravages. The reason for exemption seems to be this: After folding the leaf the insect eats all the parenchymatous matter, leaving the tomentose coating of the under side of the leaf, which protects it from its enemies. If it eats the parenchyma of the glabrous leaved varieties, nothing remains but the network of venation, which affords it neither protection against the weather nor against the attacks of the Mantis, spiders, wasps, and other predaceous insects.

The *Desmia* is the caterpillar of a moth, five-eighths of an inch long, dark, blackish brown wings, fringed with white, with a row of white spots running parallel to the fringe. It passes its chrysalis state during winter in the earth.

The *Philampellus* (vine lover) resembles the tobacco worm, and may be mistaken for it by those who are not close observers. It differs from the tobacco worm in the formation of the head and neck, which it protrudes and withdraws somewhat like a tortoise. It also lacks the horn on the dorsal extremity, and turns to a copperish red before it enters the chrysalis state. It is the larva of the largest species of moth, differing but little from the moth of the tobacco worm, and from twilight to way in the night is very busy extracting honey from the flowers in the garden. It is not yet numerous, but requires attention to keep it in check. As it is a voracious eater, it will divest the vine of all its foliage and young shoots in a short time. Your committee can shed no additional light on the prevention of the ravages by the apple or codlin moth (*Carpocapsa Pomella*), curculis (*Rhynchenus Neuphar*), etc. That they are alarmingly on the increase, no orchardist can question, for their yearly increasing ravages

clearly indicate this fact; and in seasons of short crops, like the last, they either destroy it or render it almost worthless. Your committee are satisfied that the most effectual remedy for their destruction is to increase their natural enemies. These are insectivorous birds and predaceous insects. With all his boasted superiority of intelligence, man has yet to be taught to know and respect his friends. His indiscriminate destruction of birds, which neither ministers to his wants nor adds to his luxuries, and his unintermitted warfare upon reptiles and harmless insects, show that his acts are governed by insensate wantonness and cruelty. Has he not natural enemies enough to contend with, that he so ferociously turns upon his friends? The necessity is laid upon him, "in the sweat of thy brow shalt thou eat thy bread all the days of thy life." What does that mean? It means that many untoward influences operate against him, which he must either counteract or remove in order to obtain subsistence. Whatever destroys anything upon which he subsists is his natural enemy, and we might expect to find him waging a relentless and exterminating war against it. Not so, however; his war is waged on his friends, on those which are the natural enemies of his enemies. Where one bird is found destructive of man's subsistence, fifty are found to be his allies against his enemies. Of the myriad of insect tribes that swarm over our continent, but a score or so are found to be beneficial to man; all the rest are more or less inimical. Yet upon this score man wages a relentless war. The Mantis, "rear horse or devil's horse," as it is sometimes called, spiders, the Harpalus, etc., that subsist entirely on insects, are the objects of man's most relentless persecution. Of the reptiles scarcely one is injurious to man. Even the snake is a voracious devourer of insects. Toads and lizards entirely subsist on them.

It is time that we stop and reflect on our conduct, and teach our children to respect and treat kindly their and our friends, even if they are birds, insects or reptiles.

We ought to do so zealously; but to our zeal we ought to add knowledge. In a neighboring State a paper on ornithology was read which attained the whole genus of *Picus* (sapsuckers) as enemies to man, namely, the *P. Villosus*, *P. Pubescens* and *P. Borealis*. That they are the most industrious searchers after insects, no one can doubt who has ever observed their habits; remaining with us during winter, and are always busy hunting for worms, insects and larvæ lodged under the bark. It is true they puncture holes in the bark. But I have never yet seen any injury result therefrom, nor have I observed that they eat the cambium.

The *Collyrio Borealis*, shrike or butcher bird, was also condemned because it sometimes kills sparrows and other little birds. But it also kills field mice, and is a most relentless persecutor of locusts, grasshoppers, moths, etc., which it takes a delight in killing, not for food only, but for its amusement. Examine a hawthorn or a wild plum

tree near the haunts of this bird, and you will find hundreds of insects impaled on the thorns by this bird. It is rightly named butcher bird.

In conclusion, we would suggest that the Legislature, now in session, be petitioned to pass a law for the protection of insectivorous birds.

All of which is respectfully submitted.

JOHN H. TICE, *Chairman.*

W. C. Flagg: There are two birds so much alike it is hardly possible to distinguish them when seen at a distance; the one has a wedge-shaped tongue and eats the sap wood; the other has a long, forked tongue, and lives on insects.

Dr. Hull: The one that is injurious makes a round hole, and then, with its tongue, sucks out the cambium. The holes are often placed so very close as to destroy the tree. We have often found the cambium in its bill and in its crop. The difference between the two birds is more in the tongue than the bill.

Mr. Allen: Are the holes the same?

Dr. Hull: The one makes a hole and the other inserts its tongue into the hole already made by the insects.

Dr. Edwards: I find that Dr. Trimble, of New Jersey, is making very extended observations upon birds useful and injurious to the orchard. He says the birds hear the insects under the bark, and make a hole to take out the worms.

A most beautiful basket of flowers was presented to the Society by Mr. H. A. Homeyer, of St. Louis.

It was, on motion,

Resolved, That the thanks of this Society are due and are hereby tendered to Mr. H. A. Homeyer for the exquisite boquet he has so kindly presented to the Society.

It was, on motion,

Resolved, That the boquet presented by Mr. Homeyer be sold by auction to-morrow at 12 o'clock.

It was, on motion,

Resolved, That the thanks of the Society are due and are hereby tendered to Mr. J. M. Jordan, for his liberal gift of fruit gatherers.

THURSDAY AFTERNOON.

The meeting being called to order by the President, an essay was read by Mr. T. R. Allen, on fruits for St. Louis market, which was, on motion, referred.

FRUIT FOR ST. LOUIS MARKET.

Being conscripted into the compliance with a demand made by our worthy President, and not being able to procure a substitute, I've fallen into line of active service, and am ready for the order to "charge" (not with the bayonet) on the theoretical speculators on fruit growing for St. Louis market. And as it is our design to be concise and practical, we wish it distinctly understood at the outset that we do not propose so much to consult the fastidious tastes of the good people of the city, and connoisseurs in general, as the profits of the practical fruit grower; for, after all (with due deference to amateurs and all others), this is, in our view, the *summum bonum*. We do not deny that it is laudable for the amateur to cultivate and gratify a refined taste; indeed, we admit that in this he is a co-laborer with the practical grower for profit. The man who grows for market, labors for profit, and what difference is it to him whether his customers prefer the dry, insipid, coarse old Pennock, or the juicy, high flavored pippin? As a practical man, he will look at facts as they are, and not as they should be.

SMALL FRUITS. Of the small fruits we would nominate the strawberry as a candidate for the front rank. Within a convenient distance of market, with proper and thorough culture, it is undoubtedly profitable. In one year from planting you may have a full crop for market. It is admirably adapted to those who have but a small tract to cultivate, or wish to cultivate but little, and to early realize the products of their labor. It is the first ripe fruit of the season, and has no competitor in the market, and, in fact, has just and great merits of its own. We are informed by Mr. W. Sigerson, an experienced fruit grower of this vicinity, and well known to perhaps many present, that with thorough cultivation, including proper mulching at the right time, that two thousand dollars' worth may be grown on an acre of ground in one season. As to the variety to plant, keeping the cardinal principle of profit in view, up to the present period, we would plant the Wilson's Albany. Its size, color and adaptability to carriage, are all favorable. Of quality and flavor we have nothing here to say. It sells readily.

Of the raspberry, gooseberry, blackberry and currant, we have but little to say that is favorable on the present occasion. Those who are not too distant from the market, and have but a limited quantity of land to cultivate, and that adapted to the blackberry, and like to cultivate briers, can undoubtedly cultivate the fruit to handsome profit. For the present, we assign the remainder of this wing, together with the numerous family of cherries, to the amateurs and those who are still willing to experiment.

The Grape. The grape having triumphantly passed the ordeal of its probation in Missouri, now stands out in bold relief, and challenges attention on its own merits. Although there is yet a sad want of a

correct knowledge as to its proper treatment, and occasionally liable to partial destruction by the severities incident to our climate, it has justly gained a leading position as a remunerating crop. The immense district of country, embracing many thousands of acres, that seem well adapted to its culture, adjacent to the great commercial emporium of our State, clearly indicates for it a long, bright, prosperous and triumphantly glorious future. I shall not here attempt to discriminate among the numerous family of varieties—largely over one hundred in number—that are now candidates for public favor. The intelligent cultivator cannot be much at a loss in selecting from a number of our tried and leading varieties.

TREE FRUITS.—*Plums.* Until a remedy against the ravages of the *curculio* can be found that will not cost more than it comes to, we know of but one or two varieties that we could recommend for profitable cultivation. The Chickasaw or Arkansas, and the Damson. The first are early, and the latter a very late variety, and admirably adapted to preserving, making one of the most highly flavored and delicious preserves known.

The Peach. We sincerely regret to have to say that some dear bought experience, and much observation, truth and candor, compel us to the conclusion that this delicious fruit cannot be grown to profit, as a general thing, in Missouri. Though the tree is healthy, and one of the most rampant growers, such are the sudden and violent extremes of our climate, that the fruit is killed in the bud at least four years out of five, except in chance favored localities. Where the thermometer is subject to change forty-five degrees in seven hours, the peach, in our estimation, cannot be anything like a certain crop. We are aware that we here occupy controverted ground, and that a jealousy of interest on the part of some may prompt an issue wish us; but facts are stubborn, and we are of those who believe straight out honesty the best of policies. We do not wish to be misled ourselves, and therefore will not willingly mislead others.

Pears. However reluctantly, we are compelled, for about the same reasons, to class this magnificent fruit in the same category with the peach. Although its splended qualities, when in its perfect state, will sell it for enormous, indeed almost fabulous prices, this very fact is an argument against its profitable culture, to the general fruit grower, in the present somewhat advanced state of horticulture. Of course no amateur horticulturist or agriculturist—for all who till the soil at all should cultivate fruit—will fail to cultivate the pear, peach, plum and other fruits that we have classed as unprofitable, as well as a number that we have not named at all. In the further advancement and development of the noble science of horticulture—which is the province and mission of this Society to foster—many of these may be added to our meager list of profitable fruits.

The Apple. We now come to consider what, in our humble judgment, is the prince of profitable market fruits. It is true that he who

plants apple trees must exercise patience, for he cannot, like the man who plants strawberries, plant his trees this year, and next year realize a crop that pays for all his outlay. He must wait with patience, cultivate and prune for five or six or more years, perhaps, before he is permitted to gather even a very small crop of fruit from his trees. But his time and labor are not lost. While he is cultivating his trees, he may grow crops from the soil among them that will fully remunerate all his labor, together with the cost of trees, until his trees themselves begin to yield him remunerative crops; and if he has done his work well up to this period, but comparatively little further labor is necessary but to gather and market his fruit, the quantity and profits of which will probably increase annually, as long as he may live, and then become a valuable legacy to his children. From forty to fifty trees may be grown on an acre. Say in ten years they will yield two hundred bushels of marketable fruit, worth fifty cents per bushel, which estimate, we think, is low enough, both in yield and price, to cover all contingencies and expense of marketing, and we have one hundred dollars net proceeds per acre. To what use could you put your land and make it pay better? But this is only the first estimated crop. You may very reasonably calculate on an annual increase in quantity for the succeeding ten or fifteen years, until an annual yield of one thousand bushels would be but a moderate calculation. And suppose in the lapse of that time the production generally has become so abundant that the price is reduced one-half, which is not at all probable, and we have two hundred and fifty dollars per acre net proceeds. Recollect, your orchard was paid for—paid for itself—before it began to bear. It has been no part of our intention to designate in this paper any particular varieties of applies, or of any other fruit, it was best to plant. All inquiries for such information we refer to the published proceedings and discussions of this Society, as much more valuable than any views we might present on this subject. Let those who will, for profit, plant peach trees, experiment in pears, plums, etc.: whenever we can add a plat of ground suitably prepared to our orchard, it shall be planted to apple trees.

Jona. Huggins: A gentleman said to me that the keeping of orchard in clover kept away the apple borer. Is it true that orchards pastured by sheep are more free from the attacks of the borer? My orchard is more troubled with the borer than before. I think the borer is generally more troublesome than before.

W. C. Flagg: I have no experience in this direction. My own practice has been to plow every year and keep hogs in the orchard; it is better to give them good fallen apples than not have them to eat up the wormy fruit. I had about four thousand bushels of apples from twenty acres of ground. The borer has been very bad. The drouth has done much damage. The best remedy is to have hogs in the orchard. This year I tried sheep. I turned them in awhile and turned them out again; I like them better than hogs. As to the clean culture and the clover we have no experience.

Mr. Williams: I have had considerable experience in this State and Indiana. From the appearance of the apples I can tell the condition of the orchard for the two or three years previous. In an orchard rooted up by hogs the fruit is much cleaner and finer. I have an orchard in grass and keep the hogs in during fall and winter. I consider hogs essential to an orchard. In winter the insect are in the ground in the larva state, and are taken up by the hogs in rooting.

Dr. Hull: Dr. Long put up his apples in shallow bins, and I have seen the apple worms in such numbers that they could be scraped up. When they complete their work in the fruit, they come out and drop on the ground, if they don't go into another apple, which they sometimes do, and crawling up on the stem till they find a hole or roughness in the bark, where he remains till spring, and comes out in the perfect state. They are partial to light, and in spring many can be taken by lamps. I keep hogs in summer and winter, but know no good they do in the winter. Much of the fruit drops to the ground, worms and all, and the hogs take them. Upon a place I sold while I was there, I had not a bushel of wormy fruit; since I sold it they shut out the hogs, and Captain —— asked how to keep the orchards clean. I advised him to turn in the hogs, and he has had but little wormy fruit since. I was surprised you could not grow the peach as a profitable market crop, and the same as to the pear. The plum is troubled with the curculio. I have been in the habit of combating enemies of all kinds, and have been combating the curculio, and have produced such enormous crops that the trees were killed. A single tree will pay all the labor necessary for a thousand trees. We know the insect has peculiar habits, and of this we can avail ourselves and catch him. If I give a limb a smart snap, if he is even at the extremity, he falls to the ground; he is a timid, shy insect. He will not fall upon a dark cloth, but will upon a white one. This is a fact of importance to know. You cannot understand any description I can give of my curculio catcher. It is somewhat like an inverted umbrella set on wheels. If there is an exhibition this season at St. Louis or Alton, I will try to have one on exhibition.

I will state in regard to peach orchards, they plant too many trees. They get peach on the brain. I often have men tell me they have been down to Southern Illinois and set out ten thousand peach trees. When I hear a man talk that way I know he is going to fail. The time is past in which you can plant and rob peach trees. Prepare your ground well, plant well, and attend well, and you will not want ten thousand trees. I got four dollars a bushel for my peaches; at the same time a neighbor had his thrown into the river, unsalable, because he did not take care of them. If Mr. Allen will try root pruning, he will raise pears.

Mr. Allen: I think Dr. Hull has a favorable location. The climate has much to do with our success. If we have peaches this year, it will be the first time in four years. There are a few special locations, to be

sure, that raise peaches nearly every year, but I speak as a general crop for market.

Dr. Hull: I agree with Mr. Allen that there are locations where the peach cannot be grown. In contiguity to large bodies of water, even upon low land, if on the south and east sides, you may raise peaches. I am two hundred feet above the level here. On low ground where I tried them I had a crop once in ten years.

E. R. Mason: I understand Mr. Allen to discard the raspberry, blackberry, etc. I insist the Black Cap, though not as good a fruit, cannot be discarded from the market list as a profitable fruit. It really stands in the first rank. It is less expense in planting and cultivating than the strawberry. I got one hundred and ninety-six dollars' worth from a quarter of an acre of poor ground. They are hardy and stand our winters. Mr. Coombs has five acres in the Doolittle raspberry. I get mine into the market before his.

Mr. Watson: I live on the north side of the Missouri river, and get peaches four years out of five; am about a mile from the river. A neighbor of mine raised peaches forty years in succession to make brandy.

W. C. Flagg: With regard to Dr. Hull's curculio catcher, a gentleman told me he raised forty bushels of fine plums by its use with hardly any trouble. It was the Diaper Rouge.

Jona. Huggins: In strawberry culture I have selected a piece so located in regard to its aspect as to extend the season from eight to ten days.

An essay was read by Dr. Clagett on the "cultivation of asparagus," and referred.

ESSAY ON THE CULTIVATION OF ASPARAGUS.

Among the different varieties of garden vegetables, none will furnish a dish more universally esteemed than asparagus, and viewed as a self-producer none will, on a given space of ground, consume a larger amount of gross material in its annual appearance; nor is there any which will more richly reward the gardener for the labor bestowed on it. We should, therefore, naturally expect to find its culture in every vegetable garden. But, strange to say, it appears to be regarded as a luxury too expensive for common use, and comparatively it is seldom seen; while, in fact, it might be made one of the cheapest and best of esculents.

Perhaps the greatest obstacle to its cultivation is, that it does not yield a just reward for the labor expended until the third year after planting; but this objection is more than compensated by the comparatively small amount of labor afterward required, for it needs to be planted but once, and, if properly attended to, will continue to produce large crops for many generations. I am not old enough to say how many.

In cultivation the first thing to be considered is to obtain large, tender stalks; to adapt our cultivation understandingly to the attainment of this end, we should consider the nature of the plant, the manner of its growth, its wants and natural capacities, that we may supply its wants accordingly. That this has not been done, even by our professional gardeners, is evidenced both by the mode usually practiced and the amount of inferior asparagus seen in our markets. It is to the neglect of seeking a reason why we pursue one course in preference to another, that we make such slow progress in reducing the art of horticulture to a science. We are too much inclined to follow blindly in the footsteps of our predecessors, and to be governed by mere authority; this we are compelled to some extent to do at the commencement, and we continue it from habit.

As we propose to differ widely from the long established practice, we ought to give satisfactory reasons for the change. When we commenced its cultivation, ten years ago, we knew, practically, nothing about it, consequently in preparing and planting our first bed, we were guided by such information as we could obtain from books and those practically engaged in its cultivation, with the aid of a professional gardener. We proceeded in the following manner :

We threw out the ground five feet wide and nearly two feet deep; we then threw in the bottom of the trench about five inches of well-rotted manure, on which we put five inches of earth; we then stretched a line six inches from the edge, by which we set the plants eighteen inches apart in rows. In this bed we set four rows, each one foot apart, and covered them with two inches of earth, on which we put two inches of manure, and covered it with a slight coat of earth. The directions were to set the plants a foot apart each way. When we came to set the plants the roots seemed so clearly to indicate the want of room that we added six inches to the distance in the rows. The second bed was made two feet from the first, and treated in like manner. To give the plants more room we made the next beds three feet apart, but experience has proved that we still had the plants too much crowded.

The after culture for the first season was, after the plants had come up and grass and weeds began to appear, to throw in earth from the alleys from time to time, until the beds were raised above the level of the alleys. These beds have received annually a good coat of manure, with an occasional coat of salt. They have produced annually what is considered good crops, and of a better quality than usually appears in our markets, but no comparison in point of quality to that which might have been produced had the nature and wants of the plants been properly considered, as we shall endeavor to show.

The first thing in relation to this plant which attracts our attention is its numerous, large and long roots, clearly indicating its power to absorb from the earth a large amount of food, and its need of space for its operations. The plant being made up of elements drawn from

the earth and air, those taken from the earth cannot make a part of the organized tissues of the plant, until they pass up into the leaves, and there meet and combine with the elements from the air, by which union they become vitalized and fitted to form the living tissues of the plant; when thus prepared they descend to the roots, sending out new roots into the earth, and sending up new stalks into the air. This process goes on rapidly during the growing season, increasing the roots and branches; the increase of the roots always preceding the increase of branches. At the close of the growing season, all the nutritious material prepared by the plant passes down into the roots, leaving above ground but a light, pithy stalk, which dies as the living elements pass from it; consequently, all the crop we cut in one spring, and the complete formation of a stalk above ground must come from assimilated materials stored up in the roots the previous year, for no new material can be assimilated until the organs above ground are completed to perform their functions, so that the crop we get in one season will depend upon the treatment which the plant received the previous year.

If we continue to cut the stalks as they come up late in the season, the roots will show signs of exhaustion by sending up smaller stalks, until they are entirely exhausted; and the roots which, at the commencement, were full and plump with living material, will be found to be nothing but an empty sheath. Thus, if we do not entirely destroy the plant, we may materially lessen the crop, both in quality and quantity, for the next year. It is the practice of some gardeners to clip off the small stalks which come up during the cutting season, upon the supposition that larger ones will come instead, not comprehending that the roots are already too much exhausted, and that the tops should be allowed to re-supply them. In forking up the beds in spring, care should be taken not to injure the crowns of the plants or break the roots. One spring I intrusted the dressing of my beds to a professional gardener of considerable experience, but evidently ignorant of the nature of this plant. Wishing to put a deeper covering on the crowns of the plants, he threw up the ground from the alleys a spade deep, and in doing so covered the beds with the roots which he cut, thereby materially diminishing my crop. Some years ago a gardener, living near me, had very fine asparagus beds, which yielded handsome profits. He also kept a vegetable store for supplying steamboats. As they demanded a supply of asparagus as long as he could furnish it, he continued to cut as long as his plants would send up a stalk fit for use. In a few years his beds were exhausted, and what little they did produce was spindling and worthless. This was killing the hen that laid the golden egg; but he learned something by the operation. As more than half the plants had been cut to death, the remainder had more room, and being allowed to recover their energies, produced a much finer quality than in the first instance. He now gives his plants more room, and raises an improved quality. Another neighbor, near me,

who had spared no pains or expense in preparing his beds or in supplying them with everything needful to secure success, failed to get the large succulent stalks he expected. Upon inquiry as to his treatment, I found that he had not only done all that he ought to have done to secure success, but had done what secured his defeat. He had cut off the tops twice during the summer, supposing they were exhausting the roots, while, in fact, they were indispensably necessary to their support.

If it were not superfluous, I might add numerous other cases, illustrating the bad practice of close planting and late cutting. From what has already been said, it will be perceived that the chief points to be observed to secure success are, to stir the ground to a proper depth—thoroughly fertilize it—give the plants ample room to work, and not exhaust them by late cutting; and another important requisite is a proper selection of plants. To obtain these, first select well matured seed, which may be sowed in drills twenty inches apart in the fall or spring (fall is the best). To secure good strong plants, they should not be allowed to grow nearer than three or four inches in the rows. They should be cultivated two seasons—the second season the female plants will bear seed; these should all be dug up and thrown away, and none but the male plants set in the permanent beds, for two important reasons. The seed-bearing plants will always produce smaller stalks, for the material which goes to form the seed (which is no small proportion) leaves that much less to return to the roots for the next year's crop; and seed dropping upon the beds will fill them with young plants, which will require no small amount of labor and care annually to destroy, and if allowed to grow, they will soon ruin the best prepared beds. To prepare the ground for the permanent beds, the best method is to trench it two spades deep, and thoroughly incorporate to the bottom of the trench with well-rotted manure—hog manure may be best, or bones, when they can be conveniently obtained, put only at the bottom. It is very important that the bottom be well supplied with nutriment for the plants before they are set, as there will be little chance to get it there afterward; and as the roots seek the direction of the nutriment, it is important to attract them below the surface, which is afterwards to be stirred, that they may be out of the way of injury by after culture. Such is the absorptive power of the soil, that manure placed in the upper portion of the soil will not be carried below by the rains, until the portions with which it is in contact are saturated beyond its absorptive power to retain it. It is best to trench and manure the ground a year before planting, that the manure may become properly incorporated with the soil.

The ground having been properly prepared, as early in spring as it is in a condition to work, if the patch is large enough to use a plow, we proceed to lay it off in rows, three or four feet wide, and back them up in ridges, leaving open a furrow two widths of the plow,

which should be deepened twelve inches below the regular surface, in which the plants may be set eighteen inches apart, and covered two or three inches above the crowns. The remainder of the ridges may be gradually brought to the plants by after cultivation with the plow and cultivator, leaving the furrow at the close of cultivation in the middle of the rows. When the patch is too small to use the plow, the trench may be made with the spade, and the width of the rows may be reduced to two or three feet, bearing in mind that the closer we plant the smaller will be the stalks. The brush may be mowed down in the fall, and, when dry, burned on the ground, and the beds covered with a good coat of manure annually; a coat of salt may be added every two or three years. I have not made experiments sufficiently accurate to determine what quantity may be economically applied. I judge that fifty bushels would not be too much to a fourth of an acre—I should put on more when it could be obtained cheap. In large patches, the cultivation may be done mainly with the plow and cultivator; the fork should be used in spring immediately over the crowns of the plants, and care taken not to cultivate too deep to injure the roots until after the cutting season, and until full grown stalks are formed to assimilate and send back material for new roots. The ground may then be stirred to a greater depth once, and the roots should not be disturbed afterward, but the surface should continue to be stirred and kept clean. Two years after planting we may cut sparingly, in the early part of spring, for two or three weeks. The third year will give a good crop, and may be cut until the middle of May or first of June, depending upon the early or late spring, and the strength of the plants. If we desire a supply to the latest period, we may cut one-half of the beds in the latter part of the season, alternate years, but all cuttings should cease early in June. The advantages of wide planting may be summed up as follows: First, it requires a much less number of plants, and less labor in planting; secondly, less care and labor in cultivation; thirdly, we get larger and more tender stalks, which is the great desideratum; fourthly the cutting and tying up for market (which constitutes the largest part of the labor of this crop) is greatly diminished; fifthly, the best article is the most salable, and four large stalks will bring in market double the price of a dozen small ones; lastly, we have the satisfaction of having for ourselves and furnishing others an article of the best quality. I cannot conceive of a single advantage resulting from close planting. To give more room in my first beds, I purpose to destroy all the seed-bearing plants. As asparagus is the most voracious consumer of food of all the plants we cultivate, its cultivation is peculiarly adapted to the vicinity of large cities, where manure can be had in abundance, and an equal demand for the product. Instead, therefore, of its being a luxury of the few, it might be made the earliest and cheapest vegetable for the many.

In conclusion, it may be proper to state that the depth which the

plants should set depends on the taste of the consumer. The above directions are given to meet the demands of the St. Louis market, where most customers prefer long, white stalks, while a few choose shorter stalks, changing toward green. For my own use, I would not plant so deep by three or four inches.

Dr. Clagett: The size of asparagus is a matter of taste. If cut for market, I cut it six to eight inches long; if for family, two to three inches.

R. S. Elliott: I never ate asparagus that I liked till I ate some that was cut when eighteen inches long.

J. M. Jordan: Those who buy asparagus seldom eat it. If you can break it you can eat it; if you cannot break it you cannot eat it.

Dr. Spaulding: I have grown asparagus as large as a hoe handle, and quite tender and sweet—cut it one inch to one and a half below ground. I grew it under tall tin cans. Saw no difference whether they had bottoms or not.

Dr. Miner: I have had some experience in this, and agree with Dr. Spaulding. The amount of growth depends upon the amount of force applied to the roots. It grows best on Long Island, where the salt water often covers it. From this I have applied salt as much as fifty bushels to a quarter of an acre.

Dr. Clagett: I have put one hundred bushels to one-third of an acre. The salt is best put on as soon as you cease cutting.

Dr. Miner: The plant wants as much room as a hill of corn. I think the Giant is found in its cultivation.

An essay was read by Dr. Miner on bee culture, and referred.

ESSAY ON BEE KEEPING.

BY DR. H. N. MINER.

It is with much diffidence that I attempt an essay before so much learning and so much ability as are contained in this Society. As we have been much edified by the various discussions and essays from members during this meeting, and the various branches of industry brought before our minds, I was led to the reflection that there was one branch not touched by any, but which might be enjoyed by nearly all; I have reference to the more general employment of the honey bee for the purpose of adding much to our pleasure in various ways, both as to enlightenment and profit. The honey bee is the only animal that is a profit to man that he does not labor much to feed and shelter. She works for nothing and finds herself. All that she asks is a proper place to lay up her precious treasure and be protected from her enemies. Her greatest enemy is the bee moth, which is a whitish grub, of about one inch in length, hatched by the heat of the hive and atmosphere, from an egg laid by a small, whitish miller, who, like most "beasts of prey," prowl round by night to do their mischief, enter

the hive, when the sentinels are off "guard duty," and deposit their eggs in the loose debris of the hive or in any small crevice they may find. In a few days, according to the temperature of the atmosphere, a worm appears, who crawls up among the combs and commences his work of destruction. Nothing can be constructed or contrived that will allow a bee to enter and leave but the moth miller will find entrance also, so that the only sure way to protect a colony of bees from destruction by the worms is to destroy them after being hatched.

After practical observation and experience of many years, I have never seen a hive so well adapted to that purpose as the "movable comb hive," invented by the Rev. L. L. Langstroth, of Ohio.

Bee keeping has always seemed to me to belong to horticulture, as the fruit flowers in their succession afford such ample and prolific bee pasturage. Also a fruit tree, with a low head, affords such a perfect shelter in a hot day; and what more beautiful sight than a dwarf pear or peach orchard all full of white bee hives, standing on the east and north sides of the trees, all fronting east, with the unceasing hum of happy and remunerative industry. The best thing to stand a bee hive on is four white oak stakes driven into the ground, so as to allow the hive to stand about twenty inches from the ground, the front ones the lowest, so as to incline the top to carry off the water. Other advantages stakes possess: by depositing dry ashes around them, you can keep out the little red ant; and, as each hive stands on its own foundation, it does not get jarred, and by having free room under them, they do not get blown over. I have tried the tarring of the stakes, but that soon dries and then is no protection. Any ordinary farm will support as many colonies of bees as there are acres of land in it, and in locations where white clover and fruit trees abound, two or three times as many.

To tell you what may be done from a very small beginning, I will relate my experience in three years in Southern Illinois.

In the summer of 1859 I became acquainted with an apiary of twelve colonies that were in bee gums or hollow logs, and were being devoured by the bee moth, the owner burning up two after I showed them to him. One of them that was half destroyed I gave him two dollars for, he saying they were worthless. I sent to Chicago for a Langstroth hive, and on the 22d day of August, 1859, drove the bees up into a forcing box with smoke, then took the old gum out under an apple tree, split it open, with the combs, took out the large sheets of bread and honey comb, cut them the size of the inside of the frames and fitted and fastened them there by winding them with wrapping twine, then hung them in the hive in their proper places. When I had filled all the frames, nine in number, I adjusted all, set it on the old stand, shook the bees from the box into the alighting porch, when they set up their peculiar happy hum and entered their new home. In one week I examined them, found and killed thirty worms. In another week found two or three more; did not find any more that fall, all the eggs having been hatched.

May 20, 1860, made an artificial swarm from it, besides taking considerable honey to use and sell. May 13, 1861, took a swarm from No. two. June 9, 1861, a swarm issued from No. one, so I only wintered four colonies in 1861–2. In July, 1861, I came to St. Louis. My wife took care of the bees two years, 1862–3, only I would examine them when I went home and kill the worms, if any were there. She lost three colonies.

I had eight colonies left in October, 1863, which I sold for eighty dollars, and had sold one hundred and sixty dollars worth of honey, besides using all we wanted, and that was no inconsiderable amount, for I can assure you that my honey tooth remains unimpaired yet. Honey is always double the price of good coffee sugar, and readily sold for half a dollar per pound in the St. Louis market last fall. When we consider that honey is an article that neither impoverishes the soil nor requires plowing, hoeing or fertilizing, but is a spontaneous production, all ready at the hands of the husbandman who will only procure the harvesters, with a proper storehouse for them to store the fruits of their industry in, it has always seemed very strange to me that man in superior wisdom (in some other matters) did not take advantage of all these circumstances, and improve them until our land literally flowed with milk and honey.

Bee keeping has been and even now is considered by the majority a hazardous enterprise, for two reasons: First and foremost is their little weapon which they are so ready to use, without stopping to inquire whether we approach them as friends or enemies, so that fear alone deters many from engaging in the business. The next reason is the destructive capacity of the moth, where it can remain unmolested. The fears of the ignorant are not groundless, for it is only within the last six years that a hive has been so constructed that all parts of all the combs were accessible at all times, and if enemies had obtained a lodgment destroy them. In my experience I have been led to almost doubt the propriety of some men entering into bee keeping, for almost the moment they would enter the apiary the bees would attack them without mercy and drive them away, while I would be handling them with impunity, apparently unrecognized by them. But not so; for a honey bee is endowed with the finest and keenest sense of smelling of all animals, and their antipathy to some can be accounted for in no other way but by their offensive odor, occasioned by some (to me) unknown cause. I never knew a sweaty horse to come near a bee hive that did not get stung, while it is different with an ox. I think that tippling and the neglect of the use of the sponge all over the body with soap and water, has something to do with creating an odor offensive to the honey bee.

I have heard the word "luck" applied to bee keeping a great many times, which I think fallacious. I think a farmer might as well apply the word to farming, by planting poor seed on half plowed poor soil, and neglect it all through the growing season, and then expect a good

crop, as a bee keeper to expect large returns from a neglected apiary. "Eternal vigilance" is the motto. Plow deep, plant good seed on good soil, keep out or destroy all enemies, and reasonably expect good crops. Procure good hives, keep the colonies strong, examine them often, destroy all enemies, and reasonably expect a large return for your labor. As a national as well as an individual benefit, I would like to see bee keeping multiplied, so that I verily believe that a thousand pounds of honey could be collected where one is at present. The most successful way of wintering bees is not properly understood. The bee is a warm blooded animal, and requires food and air to generate caloric, as an ox or sheep. On the same principle, the warmer you can keep them so they will remain quiet, the less food they will consume, and the more healthy they will be in spring. A dry, dark cellar, where the mercury will stand about 50° Fahrenheit, I have found to be the best place for wintering bees.

In using the Langstroth hive, I tack on a piece of wire cloth over the ventilating holes in the bottom; remove the surplus honey box cover, then lay two pieces of scantling on the cellar bottom for my bottom hive to sit on, then set them top of each other as high as desired, the cleats on the ends of the honey boards forming a ventilating space between the hives. I have never found them in a drenching or even sweating condition. I have heard of a Mr. Sprague, of Fulton, Whiteside county, Illinois, substituting corn cobs for the honey boards as an absorbent for "the breath of the bees," when wintering in the open air. We need nothing of the kind, when stored in a perfectly dry, dark place, where the temperature is of such uniformity as to keep the bees perfectly quiet.

It need not be pretended that a colony of bees will store any more or better honey in one hive than another; all the advantage one hive possesses over another is in the ease with which we can handle them and clean them of everything injurious, and take a little honey when we want to and not injure a single bee. I think there is no location in our whole country which would not support a good sized apiary, which, if well managed and not trusted to "luck" by the owner, would pay a large dividend on the capital invested. I think a good colony of bees in a Langstroth hive is worth fifteen dollars, and, take one season with another, a hive will afford forty pounds of honey, besides doubling their number, and keep both colonies strong. Here comes up another important branch of the subject. After a hive has swarmed and you wish to raise honey instead of more bees, you can find and destroy the maturing queen cells, thereby preventing their further swarming, when they will immediately go to work filling the honey boxes on top.

Hoping you will excuse all errors in this hastily written article, and thanking you for your kind attention, I bid you adieu.

An essay on drainage was read by Mr. E. R. Mason, and, on motion, referred.

DRAINAGE.

MR. PRESIDENT: Among the many means by which the mind has aimed to aid the soil in yielding the most abundant products, great merit is due to land drainage. The health of the people, as well as the wealth of the harvest, is improved by this means.

In treating of the sublect of land drainage on the present occasion, however, the aim will not be to show its benefits upon general agriculture, or upon the health of the country, but will be directed mainly at its promotion of horticulture.

The first question for the horticulturist to determine is, whether his land requires artificial drainage. The solution of this question depends as much upon the character of the soil and sub-soils, as upon the flatness of the surface, or lowness of the position of the ground; for both science and experience have united in proving, within some fifteen or twenty years past, that the naturally dry, as well as excessively wet lands, are brought and kept in a much more wholesome and medium state of moisture by the modern applications of land drainage.

When the surface of the ground is rolling, the soil mellow and rich, and the deep sub-soil sandy or gravelly, then nature has provided a system of drainage for that land, which needs not the aid of art, but such cases are rare. Nearly every tract of land is improved by drainage, and very many are thereby enhanced over one hundred per cent. in their value.

The following may be regarded as constituting some of the most important advantages of land drainage:

1st. The removal of excessive moisture, which prevents the free circulation of air through the soil.

2d. It facilitates the absorption of enriching substances by the soil, and consequently diminishes their waste by surface evaporation, and prevents them from being carried off over the surface by heavy rains.

3d. It prevents the sudden fall of temperature and consequent chilling of the growing plant.

4th. It allows much earlier tillage of the soil and, consequently, earlier ripening of the fruits and vegetables.

5th. It aids in producing a more thorough and rapid decomposition of the organic and inorganic constituents of the soil, and thereby the deleterious ingredients are rendered soluble and carried off through the drain.

6th. The sub-soil thereby partially changes, and becomes fit to intermix with the surface soil, and the texture is loosened so that the roots of plants penetrate the earth to a much greater depth.

7th. It restores moisture to the soil in times of drouth, by feeding the plant, through capillary attraction, with this reserved resource.

The enhanced fertility of well drained land is due, in a great measure, to the increased depth of feeding space for the roots of

plants. All soils are more or less porous; they are found to consist of particles of various shapes and sizes, which, consequently, never come so close together but that passages will occur between them, allowing the circulation of air and the flow of moisture. This general proposition is subject, however, to manifold degrees of limitation. When the soil is perfectly dry, these pores are filled exclusively with air, consequently, seed placed in such soil will not vegetate. Air and moisture must both permeate the soil in order to secure the growth of vegetation, and the equilibrium of these two essential elements is more thoroughly secured by drainage and pulverization than by any other aids applied to land. While it is not contended that drainage will, of itself, entirely protect land from the effects of extreme drouth, yet the universal testimony of intelligent agriculturists in this country, as well as Great Britain, is unanimous that drained lands suffer far less than undrained.

The farmers of the West, and the horticulturists in the vicinity of St. Louis, are not secured against calamities that have occurred in the garden and granary of the Old World, on the banks of the Nile. Though no seven years of famine have yet blasted the hopes of the tillers of the soil in the valley of the Mississippi, yet experience has shown that they are liable to encounter withering drouths and drowning rains. It, therefore, becomes a question of great importance how we can best guard against these adversaries of our soil, and aid it in yielding the largest crops of luscious fruit.

Drouth exhausts the moisture from the soil and fills its pores with air. In this condition of the soil vegetation withers and dies. Standing water expels the air from the soil and fills its pores with water. In this condition of the soil vegetation is drowned to death, and every prolonged excess of air or of water in the soil sickens the vegetation. The temperate and steady equilibrium of air and moisture in the soil refreshes and invigorates vegetation and enables it to produce crops surpassing both the ordinary quantity and quality.

The main aim, therefore, in guarding against both the drouth and the draining of the soil, should be to secure for it this temperate and steady equilibrium of air and moisture. If all the rain that falls upon the soil should pass through it into reservoirs beneath, and the surplus, beyond what was wanted at the time, should be carried away in under-currents, then, in the event of heavy rains, the air would mingle freely with the moisture in the soil. If the glowing rays of the sun in midsummer, while drying up the surface of the soil, should also draw up the moisture from reservoirs beneath the soil, then the soil would be compensated for the loss through evaporation, by the supply afforded from these internal resources, and the drouth, which otherwise might prevail, is counteracted by the moisture rising and mingling freely with the air in the soil. It is upon these principles and to these results that drainage works.

Undrained land in the opening of spring is usually saturated with

water, which hinders cultivation until the soil is relieved by the slow process of percolation and evaporation.

By proper pulverization and drainage this land would be found in a suitable condition for cultivation at all times when not closed by frost. Drainage improves the warmth of the soil. It is a well established chemical fact, that, under the warm rays of the sun, the wetter the land is the greater will be the evaporation, and, consequently, the greater its excess of coldness. This is verified by a method often used to cool wine in the summer—by wrapping wet flannel around the bottle, and placing it in the sun or before a fire. As the moisture in the flannel evaporates, the temperature of the wine falls to almost a freezing point. Wet land will be found much colder in the sun than in the shade.

Soil does not act chemically in the process of the germination of seeds; its only action is to afford the means of supplying food, moisture, air and warmth continually after germination.

From the facts and principles above stated, the conclusion may be drawn on the question, what lands need drainage, and what not? Viewing the lands of Missouri, it will be seen that large quantities possess the qualities of soft, mellow surface and deep, gravelly subsoil. These are drained by nature. But viewing the lands of St. Louis county, especially along the line of the Pacific Railroad, except along the bluffs of the Meramec river, it will be found that the compact clay sub-soil prevents the percolation of water to a sufficient depth in rainy days, and the attraction of moisture upward during drouth, and, therefore, artificial means should be used to drain all such lands.

The health of the region would be improved by draining such lands, as the health of the city is improved by its sewer system; but the certainty of greatly increased quantity and quality of vegetables and fruits on such ground should stimulate thorough and prompt action by horticulturists in applying this important aid.

The two most marked indications of the necessity of this aid are, first, that after heavy and prolonged rains such land remains a long time too wet to till; and, second, that, during a warm and dry spell, the surface cracks and becomes too hard for the growth of vegetation, and not only difficult, but almost impossible to work, and when a refreshing shower of rain falls these open fissures close up, and the rain, instead of passing through, and thereby fertilizing the soil, is in a great part shut off and driven over into some ravine.

Judging from my own experience in draining this class of lands, about ten miles from the city on the Pacific Railroad, I would recommend the thorough breaking up and pulverization of the soil to a depth nearly as great as the drains are laid. If the trenching is two feet, the drains should be from two and one-half to three feet. If the land is plowed and sub-soiled to a depth of from one foot to eighteen inches, the drains need be only from six to eight inches deeper.

In my first experiments in draining, I followed the plan laid down in most of the books on that subject, making my drains three feet deep and thirty feet apart, the rule being that a drain three feet deep draws all surplus water fifteen feet on each side of the drain. My land being trenched or plowed to a depth not exceeding fifteen inches, I found that the drain affected the land only to the depth of fifteen inches, and did not draw off the excess of moisture from as great a distance as indicated in the books.

Last season I made a test of this sort: On each side of an open drain, three feet deep, I excavated several square pits, three, six and nine feet from the drain, and twenty inches deep. These pits were filled with water up to the line where the soil had been pulverized, say eight to ten inches of water. At the expiration of twenty-four hours not a drop of this water appeared to have reached the main drain.

A similar result will be found in the district referred to, when cisterns are dug to the depth of from eighteen to twenty feet, and walled up in the rough, without mortar or cement. A very small quantity, if any, water will find its way into the cistern, even after heavy rains, except only through the top, although, under the rule referred to, the surplus water of a large circle should find its way to this large and deep cavity.

These illustrations serve to show the firm tenacity of the clay subsoil of the lands in my neighborhood, the necessity of loosening the sub-soil, and the propriety of making the drains within thirty feet from each other, and less than one foot below the loosened sub-soil, in order that the beneficial effects of the drains may be realized.

When the subject of drainage is urged upon our horticulturists, the objection is generally raised that the expense is too great for general application. This objection is a serious one, and difficult to overcome in these times of high prices for materials and labor. Formidable, however, as this objection appears, if it could be proved that our lands, by drainage, would yield us an annual increase of products to the amount of twenty-five per cent., then, doubtless, this objection would quickly disappear.

I find that the concurrent opinion of all intelligent and practical cultivators in this country and in Great Britain, who have tested drainage with direct reference to the increase of cultivated products, sustains the proposition that at least from fifteen to twenty-five per cent. additional returns are realized on drained lands. These estimates are mainly made on general agricultural crops of cereal grains and the various grasses. Now, if the same beneficial results follow the drainage of land for the horticultural crops of our fine fruits and vegetables, this per cent. increase will soon reimburse the cultivator. For instance, consider the grape crop. Twenty-five per cent. increase would, in one year, vastly more than repay the expense of drainage. I am well satisfied, from my own observation,

that wherever drainage is desirable for vine culture, the return will be increased more than twenty-five per cent. by drainage.

As to the best mode of making drains, I find a great variety of opinions. My own experience has been confined to the use of the mole drain machine, clay-burned tile and stone. In the spring of 1860 I drained some five acres of land with the mole drainer. The benefit resulting from this experiment was temporary. By the following spring portions of the drain had caved in, and the balance made a convenient subterranean race course for rabbits. I am satisfied that this mode of draining will not answer in our hard, tenacious clay soil. The ordinary clay-burned tile, in my opinion, makes the best drain, having reference to cost and endurance. Stone, when at hand, will be found both cheap and serviceable for constructing drains.

Portable machines for the manufacture of clay tiles are now used in various sections of the country. They might be much more liberally employed in St. Louis county, as they would greatly lessen the expense, while, at the same time, they would more widely extend the benefits of the system of land drainage.

With these brief suggestions, as results of my study and observation of this subject, I commend it to the careful consideration of our horticulturists, and hope that the trials they may make will be strictly noted and fully reported, so that each of us may be profited by the experience and judgment of others.

Dr. Spaulding: In regard to the impermeability of our soils. I dug a cistern fifteen feet deep, and four feet from the cistern there was water which stood for two or three days. I wish to inquire what distance apart you consider necessary for a drain two and one-half feet deep.

Mr. Mason: Twenty to twenty-two feet.

Dr. Miner: In making the drain of stone, would you make it an open, square drain?

Mr. Stewart: Fifteen years ago my father put in a rock drain with cobble stones, eighteen inches deep, and they are still good.

Mr. Mason: In trenching a piece of land, fifty feet in width and six to eight rods long, on which was planted a vineyard, the water rose to the surface and flowed over. If you will trench deeply on this land, it may do without drains, because it plows on the *hard pan*.

Dr. Spaulding: Sub-soiling without draining will do but a very short time. Sub-soiling will be of little use more than the first year, without thorough draining.

Mr. Mason: We cannot expect large returns from land in orchard or vineyard, without under-draining.

THURSDAY EVENING.

Dr. Schroder obtained permission to address a few remarks upon the subject of sweetened wines. He stated that the American people used much more sugar per head per annum than was used in Europe; that the American taste was such that no sour wines would ever become an article of home consumption, and that native wines, to become a domestic drink and banish the use of alcoholic drinks and of lager, must be palatable; that there is an extensive portion of this country where the grape can be cultivated successfully, but did not attain sufficient sweetness to make a good wine. To meet these wants, he, in many instances, adopted the method of Dr. Gall, testing his must with the saccharometer, and bringing up the must to the standard with grape sugar. He showed that he raised fine crops of peach blow potatoes. These he crushed, removing the starch; treated the starch with acid and converted the starch into grape sugar. He kindly promised to furnish the Society with an account of the mode of its manufacture.

E. R. Mason: There are some of the statements made by Dr. Schroder in regard to the preparation of the soil upon which I wish to remark. As these views, when published, go forth as the views of this Society, I wish the views to be correct. In regard to opening up the soil with the tiller. This may do in deep prairie soil, but in the lands on many of the farms in this county and State the top soil is thin, and the sub-soil a very stiff clay. In preparing the land I have to trench, or the rain will wash away the soil; and I have fair success in grapes. Now I have to put on six inches of soil on the top, which is more expensive than had I trenched at first. I am now trenching with the spade two feet deep. If I had to trench on the hillside I would have an open drain on the lower side, to catch the wash, but would trench the entire land.

Mr. Stewart: The point of the value of drainage is one on which all intelligent vine growers are agreed. The question is, what is the easiest mode to effect it? It is to me of little consequence in my soil. First, I use a large two-horse plow; to that I attach four horses, and run ten inches deep; then take a trench plow, and, with four horses, run eight inches deep, and then follow with the sub-soil plow, and cut four to six inches deep, and thus get a depth of twenty to twenty-four inches. This is done in the fall. In the spring I spread manure over the surface, and plow it in; stake off two rows at right angles; at two sides of the vineyard mark them off. A man makes the holes, a boy drops the vines and another sets in the plants, and thus two men plant a thousand vines a day.

Dr. Hull: I have had the very difficulty stated by Mr. Mason. I had a piece of hillside land, and broke it up very deep; a heavy rain came and washed the soil away; tried it again, and in a week afterwards a severe rain fell again, washing so badly as to ruin the land. To avoid

this, I commence at the summit of the hill and set off the rows in terraces. I then commence at the bottom with a Cincinnati side-hill plow, and turn back and forth till I form the terrace, and with a light plow cut out a clean back furrow, so as to cause each terrace to hang a little to the hillside; a man with a spade clears out the space. I continue this till the whole ground is gone over, thus leading the water along the terraces to convenient places. I plant the vines about a foot from each of the terraces.

C. W. Overman; In regard to washing upon hillsides, which is very important, I would suggest, in connection with the Doctor's trenching, that to obviate the danger of washing, it is necessary to throw up little dams at intervals, say of every rod or two or three rods, to throw out the water; you must make the dams so secure as to throw out the water and prevent it accumulating.

Dr. Spaulding: Do you plant so as to incline the vines?

Dr. Hull: They run in the row.

Dr. Clagett: I am glad at the course of this discussion. There will be differences in the mode of preparing the soil in different locations, as well as differences in the varieties to plant. With us thorough trenching with the spade will be the best mode. Suppose we go to plant an acre, which will produce one thousand dollars, the cost of trenching with the spade and draining will be, say two hundred and forty dollars, while it can be plowed for forty dollars. Here, then, is the interest on two hundred dollars, at ten per cent., or twenty dollars a year, taken from an income of one thousand dollars. Even at these figures will it not pay and pay well to prepare the ground thoroughly? and I would rather have one acre so prepared than two in the usual manner. The fault with us is not our getting in too few acres; we plant too much and attend too little. The fault with all our husbandry is, we spread it over too much surface.

FRIDAY MORNING.

The meeting was opened by prayer by the Rev. Mr. Rice.

Dr. Long, at the particular request of the Society, read an essay, originally prepared for the Alton Horticultural Society, on "pruning," and it was, with the consent of Dr. Long, referred for publication.

REPORT ON PRUNING THE APPLE.

Mr. President: It is still a question with some fruit raisers whether the apple tree should be trimmed. The committee to whom the mat-

ter was referred would, therefore, beg leave to report that the orchard is dependent on its culture and training for a profitable return to its owner. From the day it is planted, care is necessary, either in the cultivation of the soil, guarding against insects and animals, and the proper pruning necessary to form well balanced heads and symmetrical trees. A great deal has been written upon this subject, and but little effected, and let you go to any neighborhood in this part of the State, and it might be said in the "United States," and there is to be seen orchards with trees of all shapes that can possibly be imagined, and with sufficient tops to make three or four from one.

Pruning ought to be commenced before the tree is planted. To prepare the tree for this purpose, the top should be cut away in proportion to the roots, leaving limbs equally around the stem, and within three to three and one-half feet of the roots. Cut away the laterals that would make forks, and shorten in most or all of the remaining limbs, which must be done with great care, for it is necessary to give the tree good shape to start with. Therefore, if it is necessary to run the top up, cut the limbs so as to leave the inside bud at the cut extremity; if to spread the top, leave a bud upon the outside. Soon after the tree sends out its leaves to the number of three to five from a bud, they should be thinned out so as to allow the shoots that are to remain a more vigorous start; a perfect thinning is not advised at this period of growth.

A second trimming or thinning of new shoots should be attended to in the last of July or the first of August. The knife may now be needed to remove some spurs that have become too strong for the fingers. At this time remove all shoots that start from the roots or body of the tree. This work having been carefully performed, you have at the end of the year a miniature tree of good shape, and a young orchard worth looking at.

In the spring or early summer of the second year, the trees should receive the careful attention of the owner (for he is the right man to attend to it), and all shoots cut away that have a direction to cross important branches, and those that have started from the main limbs near the body. The growth of the limbs should be carefully watched through the second and third years, and if they are growing faster on one side than the other of the tree, shorten in the rapid growers, as it is necessary for the future profit of the tree that it should be well balanced over the roots; this care for shaping the tree should be continued for the first four or five years, and the shoots from the roots and suckers be carefully kept rubbed or cut off. The limbs of the trees at the end of the fifth year, and of some kinds sooner, will be found in the way of cultivating the orchard, but we deem it advisable to let them remain now upon the body for a protection of it from the sun's influence, and it is easier to maintain the trees in their vertical position when the head is low.

The trees having become firm in the ground, and the body having

sufficient vigor to resist the effects of the sun, a commencement may now be made in removing such limbs as are found to be too low for cultivating with a horse. Also thin out the primary limbs, and continue to do this from year to year, till the trunks are of sufficient height. Attention, also, must be continued to shaping the tops by thinning, shortening in and cutting off as circumstances require. Before it will be found necessary to cut away some of the primary limbs, they will have become quite large, perhaps three or four inches in diameter; these should be taken off while the tree is in its dormant or resting stage, as it will give the cut surface time to become seasoned or dry and sun-cracked, before the sap begins to flow, affording the best possible opportunity for applying a protector. This should be done in November or December, and in the first of March apply with a painter's sash brush (while melted and very hot) the following composition, viz: rosin, three parts; beeswax, two parts; tallow, one part. You will be satisfied with the result.

The months of June and July are considered the best time for thinning out the tops of bearing trees. The trees are then so well provided with leaves that they will hardly feel the check produced by removing all that is necessary; the wounds heal more readily than at any other season; it is sufficiently early to benefit the present crop, and the right time to bring out buds for the next year. All cuttings off of limbs should be as nearly level with the side of the trunk or limb as possible to get it.

We conclude by noticing the following advantages from a careful and judicious pruning. The horticulturist secures for himself an orchard of trees of perfect shape, which always affords him pleasure when walking through it, and he is not ashamed to invite his friend to go with him. He secures symmetry, and by this we mean that trees of the same kind have the same shape or form—not that all of the trees have the same form, for it would be labor lost to try to make an "Esopus Spitzenburg" and a "Lady Apple" tree look alike. It affords easy access to the tree for picking apples, the facilities for gathering them being so much increased as to nearly if not quite balance all the outlay of time and expense. It opens the trees so that the sun has better chance to impart its influence in ripening the fruit and perfecting its color, which is considered of great importance. The apples, though not as numerous, are larger, fairer and more in quantity, consequently commanding a greater price in market, which is the ultimatum of our efforts and desires.

Dr. Long: In pruning large branches in summer the sap that exudes will "citrify" and injure the bark below, but in pruning large limbs in November and December the cuts dry up. In June and July it is best to thin out the thick growth.

Dr. Clagett agreed upon the absurdity of leaving long stumps in pruning.

Mr. R. S. Elliott introduced the following preamble and resolution:

WHEREAS, a citizen of St. Louis, Henry Shaw, Esq., in a spirit of enlightened liberality, has had in progress for some years a botanical garden in the vicinity of St. Louis, and contemplates, as is understood, the donation of said garden for the use of the public, under some public authorities who may suitably take charge of the same; therefore,

Resolved, That a committee of ten be appointed by the Chair to visit the Botanical Garden of Mr. Shaw during the coming season, and report on the condition, prospects, and, as far as may be, destination of said garden, to the next meeting of this Society.

Adopted.

Whereupon the President appointed Dr. C. W. Spaulding, Dr. B. F. Long, Mr. E. R. Mason, Dr. E. S. Hull, Messrs. Wm. Muir, C. R. Overman, W. C. Flagg, C. M. Saxton, N. J. Colman, Jona. Huggins, as said committee.

It was, on motion.

Resolved, That the President be added to said committee.

Mr. Elliott had no correspondence with Mr. Shaw upon the subject.

Mr. Edwards: There is no doubt Mr. Shaw will be most happy to take you through the grounds—hundreds visit them every season.

Dr. Hull: A committee might afterwards be appointed to procure specimens of fruit trees, etc., for a portion of these grounds. Such a garden is one of the greatest wants we feel in Illinois.

Dr. Clagett: I think the idea good.

It was, on motion,

Resolved, That the proprietors of nurseries in the West be requested to furnish to the Corresponding Secretary of this Society statements of the area in use in such nursery, the kinds of plants, trees and vines in such nursery, their annual sales, etc., in order that the information thus collected may be condensed and embodied in a report to this Society at its next meeting.

Dr. Spaulding: The Society will request the Corresponding Secretary to endeavor to prepare the report in time to be published with these transactions. It is a subject of value alike to the nurserymen and the Society.

The report of Committee on Wines was read and referred for publication.

Your Committee on Wines respectfully submit the following report:

CATAWBA. Of this variety we had a remarkably poor exhibition, there being but four samples, only one of which possessed real merit, while at previous meetings we have had more than double the number of samples, and nearly all good. No. 1, by Dr. Schroder, Bloomington, Illinois, was a pleasant wine, but considered too sweet for pure Catawba. No. 2, name unknown—a poor article. No. 3, name unknown—a good wine, but not considered pure; probably mixed with

Herbemont. No. 4, by Michael Pœschel, of Hermann; best, and a superior article.

CONCORD. We desire to call the attention of the Society particularly to this new variety of wine, which, we think, we are warranted in saying will become a formidable rival of Catawba. No. 1, Michael Pœschel, Hermann, best. No. 2, Eisenmayer Brothers, Mascoutah, Illinois, an excellent article; by some of the members considered quite equal to No. 4. No. 3, Dr. Schroder, a light colored sample, considered fair. No. 4, William Pœschel, Hermann, second best.

CLINTON. Of this variety there were five samples, three of them being quite meritorious and two imperfect. The exhibitors were C. C. McClure, St. Louis county; Jacob Rommel, Hermann; S. Miller, Lebanon, Pennsylvania; George Husmann, Hermann; Dr. Schroder, Bloomington, Illinois. The sample by Jacob Rommel, best, by George Husmann, second best, and that by S. Miller, nearly equal.

HARTFORD PROLIFIC. One sample only, by Dr. Schroder, flavor good, very pleasant, supposed to be sweetened. This is the first of this variety exhibited at our meetings; we hope to see more of it next year.

RULANDER. No. 1, George Husmann, second best. No. 2, Dr. Schroder, best. Both samples were good; No. 1 was considered deficient in the peculiar boquet of this excellent wine.

HERBEMONT. No. 1, by Jacob Rommel, best. No. 2, Mr. Wütherick, Hermann, second best. No. 3, Dr. Schroder, Bloomington, Illinois, good.

DELAWARE. No. 1, vintage of 1863, Jacob Rommel, Hermann, a very good article. No. 2, vintage of 1863, by J. Mettier, Cincinnati, Ohio, very superior, best. No. 3, Dr. Schroder, fair. No. 4, Jacob Rommel, second best.

TAYLOR'S BULLITT. One sample only, by M. Wütherick, very good. It was remarked by a member of the committee, who is himself an importer of wine, that "if we can make plenty of this wine, we can stop the importation of Sherry and Madeira."

DIANA. One sample, Dr. Schroder, very fair to the taste and worthy of further trial.

NORTON'S VIRGINIA. No. 1, name unknown, a very good wine. No. 2, Eisenmayer Brothers. No. 3, Michael Pœschel, second best. No. 4, Dr. Schroder. No. 5, M. Wütherick, best.

MIXED WINES. No. 1, M. Pœschel, Norton's Virginia and Concord, very fine, the most desirable mixture on exhibition. No. 2, Concord and Clinton, Dr. Schroder. No. 3, Norton's Virginia, Herbemont and Cunningham, by George Husmann, very good. No. 4, Norton's Virginia and Delaware, by William Pœschel; good wine, but not recommended. Some other samples were before us under fanciful names, among which the committee found nothing to recommend.

CIDER. By George Husmann, fair.

APPLE BRANDY. By George Husmann, very good.

NORTON'S VIRGINIA BRANDY. By George Husmann, very fine.

CURRANT WINE. Dr. Long, Alton, Illinois, eleven years old, very superior.

Respectfully submitted,

L. D. MORSE, *Chairman.*

Samples of very fine oranges were presented by Captain Swon, Webster Grove, St. Louis county, grown by himself.

Some discussion was had on the question of sweetened wines and the duty of the Society in relation thereto, when it was, on motion,

Resolved, That a permanent committee be created, to whom all wines, other than those made from the pure juice of the grape, shall be referred.

It was, on motion,

Resolved, That a committee be appointed to examine the boquet presented by Mr. Homeyer, and report the names of the flowers to the Society. The President appointed John H. Tice, Charles Connon and Carew Sanders said committee.

The report of the Fruit Committee was read and referred.

Your Committee on Fruits beg leave to make the following report on the fruits exhibited by George Husmann: Newtown, Spitzenburg, good specimens; Surprise, White Winter Pearmain, Michael Henry Pippin, Fall Green, Rhode Island Greening, Fulton, Rawle's Janet, Lansingburg, Wine Sap, Baldwin, Red Winter, unknown to the committee, as also Red Russet, Nonpariel, Milam, Long Green, Autumn Swaar, White Pippin, Vandevere of Illinois, Ortley, Yellow Bellflower, Newtown Pippin, Pennock, Golden Seedling, and one marked unknown, believed to be Fameuse, all of good size and in fine order.

B. W. Davis: Newtown Pippin, Rawle's Janet, White Winter Pearmain and Gilpin, all correct and good specimens.

By W. T. Essex: Gilpin, Rawle's Janet, Wine Sap, Pryor's Red, Fallawater, (marked Newtown Pippin) Hewes' Cider, all fair specimens.

By Judge Alt: Ortley, White Winter Pearmain, (marked Smith's Cider) Newtown Pippin, (marked Ox Eye) and Campfield, all very fine but the last.

By Mr. McNutt: Rawle's Janet, Pennock and Pottinger, very fair specimens.

By unknown party: Lady Apple and Glout Morceau Pear, very good.

By William Muir: Rawle's Janet, Gilpin, Hewes' Cider Crab, Smith's Cider and Milam.

By Charles Morris: Lemon Pippin.

From Captain Swon, grown at Webster Grove, some oranges, very fine, well ripened and highly flavored.

From Cyrus L. Edwards, a very fine specimen of cotton grown by him in Missouri.

Considering the severity of the frost one year ago, the amount of

fruit was very large, truly fine, and we have been able to show that we can have fruit in the severest times, and there are good reasons for encouragement to extend the dominions of the orchard.

All of which is respectfully submitted.

J. M. JORDAN, *Chairman.*

The report of the committee on dog laws was read and referred for publication.

The committee appointed to memorialize the Legislature on the subject of a "dog law," have considered the subject, and have agreed to ask the Legislature to pass a law to tax dogs in the following manner, viz: to impose a tax of one dollar on the first dog, and two dollars for each additional dog; three dollars for the first female dog, and five dollars for each additional female dog. The assessors to be required to annex to the assessment roll the names of persons liable; that the tax on dogs be a lien on personal property the same as other taxes. That every taxed dog shall have a collar and badge marked plainly with the owner's name and the collector's stamp.

That it shall become the duty of the collector and the privilege of any other man to kill a dog not so licensed. That the collector shall have one dollar for each dog he shall kill. That the owners of dogs killing sheep shall be liable for the damages perpetrated; and if the owner should not be found, the loss shall be paid out of the fund arising from the dog tax.

We present this report in order to obtain the sense of this Society in regard to the propriety of obtaining such an act.

B. SMITH, *Chairman.*

It was, on motion,

Resolved, That this report embodies the sense of this Society on the subject of a dog law, and the committee is instructed to put the report into effect.

REPORT OF SPECIAL COMMITTEE ON BOQUET.

The special committee to whom was referred the basket of flowers presented by H. N. Homeyer, have examined the same, and beg leave to report that the boquet was arranged in exquisite taste, and contained the following varieties of flowering and leaf plants:

LEAF PLANTS. Discolor, poinsettia, pulcherima, tradescomtia and colens verschaffaltii.

FLOWERS. Camelia japonica, three varieties of white, one rose-colored. Epiphyllum, four varieties; begonia, four varieties; heliotrope, two varieties; lantana, bouvardia, cuphea platy centra, cobea, scandens, primula, chinensis, three varieties; ageratum, Mexicanum linum, tryginum, sweet alyssum, scarlet geraneum and hydradentia rosea.

All of which is respectfully submitted.

JOHN H. TICE, *Chairman.*

It was, on motion,

Resolved, That the report be received, and referred for publication with the proceedings, and a copy furnished the purchaser of the boquet.

The sale of the boquet being the special order, Mr. R. S. Elliott was requested to act as auctioneer, and after a spirited contest among the devotees of Flora, the boquet and two of the oranges presented by Captain Swon were knocked down to Mr. E. Richards, Sr., of St. Louis, at twenty-one dollars. The remaining orange fell to Dr. C. W. Spaulding, at fifty cents.

FRIDAY AFTERNOON.

The meeting being called to order, a fine "phantom boquet" was presented to President Mudd and placed on his desk by Mr. John Wells, practical botanist, St. Louis.

It was, on motion,

Resolved, That warrants be drawn on the Treasurer for forty-eight dollars and thirty-five cents, being amount of printer's bills paid by the President, and for ten dollars to Edward Woodson, Janitor of the court room.

The Secretary stated, for the information of members, that through the kindness of the Librarian of the Mercantile Library, of St. Louis, he had examined a new work much wanted by all cultivators of the soil, "*The Agriculturist's Weather Guide*," by Criswick, published by Rogerson and Tuxford, 246 Strand, London, 1863; cost in gold in London, one dollar and twenty-five cents; it met the wants of the meteorological observer better than any work he had seen as a hand book.

PROTECTION OF ORCHARDS.

The committee to whom was referred the subject of petitioning the General Assembly of this State to pass a law for the proper protection of fruit and fruit trees, have considered the subject, and beg leave to report a draft of a law for that purpose, and recommend the passage by this Society of the following resolution:

Resolved, By the State Horticultural Society of Missouri, at their annual meeting, January, 1865, that the General Assembly of the State of Missouri be respectfully requested to enact the following law, or one of similar force and effect, for the proper protection of fruit

and fruit trees from the depredations to which they are subject, without any adequate legal protection.

MARTIN WILLIAMS,
D. T. JEWETT,
NORMAN J. COLMAN.

"Whosoever willfully and maliciously enters any orchard, nursery, garden, vineyard or other inclosure, and takes away, mutilates or destroys any tree, shrub or vine, or steals, takes away or destroys any plant, flower or vegetable, without the consent of the owner thereof, shall be punished by a fine not exceeding one hundred dollars, or by imprisonment in the house of correction or county jail not exceeding three months; unless the property above mentioned, so destroyed or carried away, shall exceed the value of ten dollars, and in that case the offender shall be deemed guilty of larceny and punished accordingly. If the same person shall be convicted of the second offense under this act, the fine shall be not less than ten dollars or the imprisonment be less than five days."

A letter was handed to the Secretary from J. Prestele, Sr., lithographer and painter of fruits and flowers, Amana Society, Homestead Post Office, Iowa county, Iowa, in reference to specimen plates sent, which had not reached the Society.

The Business Committee reported the following resolutions, which were adopted:

Resolved, That the thanks of this Society are tendered to Rev. Dr. Elliott, Rev. Mr. Dunlap, Rev. J. M. Maxwell and the Rev. E. V. Rice, for their services in opening our morning sessions with prayer.

Resolved, That our thanks are due to the newspapers of this city for their liberal courtesy in noticing and making reports of our meetings.

Resolved, That our grateful acknowledgments are due to the proprietors of the Planters' House, Barnum's Hotel, Lindell Hotel, Everett House, Olive Street Hotel, City Hotel, Western House, Randall House, Douglas House and Belleview House, for their hospitality and liberality in entertaining gratuitously our members from abroad.

Resolved, That to the justices of the County Court, and to Mr. Quigley, the janitor of the court house, we return our renewed acknowledgments for the comfortable quarters furnished for the use of the Society.

Resolved, That the Pacific, Iron Mountain, North Missouri and St. Louis and Chicago Railroads have shown a liberality and public spirit, in returning members to their homes, that deserves our warmest thanks, and the imitation of other roads.

Resolved, On behalf of the Illinois members, that we again return our thanks to our Missouri friends, for their kind attentions and hospitality during our stay in this city.

W. MUIR, *Secretary*.

REPORT OF THE VINEYARD COMMITTEE.

To Henry T. Mudd, President of the Missouri State Horticultural Society:

SIR: On behalf of the committee, I respectfully report:

First. That the disastrous cold of January first and second, 1864, was so destructive to the grape buds and even vines in the Mississippi valley that the scanty show of fruit, and sometimes desolate appearance of vineyards, made an examination less agreeable, though, perhaps, not less valuable.

Secondly. That although your committee contemplated visiting a large number of vineyards in Missouri, Illinois and Ohio, they were precluded by individual engagements of public and private character from carrying out their plans.

Thirdly. That their report consequently must be limited to a few places visited during the past season, and some notes of vineyards visited previously, but not reported to the Society,

ALTON VINEYARDS.

Mr. Husmann and myself visited some of the Alton vineyards on the sixth of September. This region in its natural advantages is excelled by none which it has been our fortune to visit. The line of river bluffs on the Illinois shore between Alton and the mouth of the Illinois river is high, and covered with a dry and porous bluff formation, that seems exceedingly well adapted to the growth of all fruits, particulary the grape. More attention, however, until lately has been devoted to the peach and other fruits, and the region is not so well developed as its capabilities deserve.

Louis Sticritz, at the little town of Clifton, three miles above Alton, has terraced a southern hillside with stone, and is growing some thirteen hundred Catawba vines, in a soil full of limestone *debris*. The western end of the vineyard has a stronger clay soil. The preparation has been deep trenching, and the planting very close—to make the most of the costly preparation. Cultivation is entirely by hand. The vines are trained to single stakes, and the pruning and training are according to the old methods. There is a good deal of leaf blight, especially where the soil is rockiest, the western end of the vineyard on the clay soil appearing a good deal healthier. The frost of last winter had done some mischief, but there was nevertheless a tolerable crop of fruit. The grapes are quite sweet on the warm, rocky soil, but on the whole do not present a very healthy appearance.

Dr. Hull, whose vineyard was noticed in our last year's report, has a very fair crop of fruit, by irregular pruning. Snow drifts formed on the terraces during the severe cold, so as to cover and protect sometimes a part and sometimes the whole of a vine, and thus preserved a

sufficient number of fruit buds to make a good crop. We saw the Clinton again in this locality, very well ripened and pleasant to the taste, and without the harshness attributed to it in more northern regions.

Washington T. Miller, residing on the bluffs within the city limits, has a novel and handsome vineyard, in a large sink hole, fifty-seven feet deep, and not less than three acres in extent. The soil is the prevalent loess or bluff formation, prepared only by digging holes three and one-half feet wide and three deep in the blue grass sod. This method, however, Mr. Miller did not find satisfactory, and trenched his remaining grounds. The Karst is used in May and August for cultivation. Pruning this year irregular. The varieties planted are five thousand Catawba, four hundred Isabella, four hundred Concord, one hundred Delaware, fifty Norton's Virginia, fifty Hartford Prolific, beside a few each of Clinton, Diana, Northern Muscadine, Herbemont, Allen's Hybrid, Clara, Maxatawney, Taylor, Rosine, Cunningham, Devereaux, Rulander.

Diseases have given Mr. Miller little or no trouble. The Isabella blights occasionally, and ripens irregularly. The vines were mostly set in 1857 and 1858, eight by eight feet. In 1859 four barrels of wine were made. In 1860 the hurricane of that year destroyed the crop. In 1861 there was a good crop; in 1862, the same; in 1863, a large crop; in 1864 it was a good deal injured by frost. The Isabella, which is nearly a discarded variety, we found here very handsome and of fair quality.

HIGHLAND.

The vineyard of Messrs. J. and S. Koepfli, of Highland, Madison county, may be described, in this connection, as affording the best example of long continued experience and observation in a *prairie vineyard.*

I visited this vineyard in 1862. It is situated on a southern slope, nearly in the shelter of one of the groves that crown the eminences about Highland. The soil of these eminences is probably more porous than that of the surrounding prairie. The ground was trenched to the depth of two feet, rotten manure being put in the bottom, and the soil reversed. The vineyard was planted in 1847–48–49. A portion was planted six by six, which, by layering, was reduced to three by six. The remainder is planted three by five. Four and one-half acres are planted with about twelve thousand vines. Cultivation consists in plowing between the wide rows. Well rotted manure, from neat cattle, is used with good results.

For their views on pruning and wine making, the Messrs. Koepfli referred me to the Patent Office Reports of 1856 and 1860. The only variety fairly tried is the Catawba, which they regard as sufficiently satisfactory. It makes wine which would be called good in Europe.

The blight affects the Catawba more or less every year, occurring commonly about the first of July, but as late as the end of July in 1862. In 1851 the grapes were all killed by a frost, on the first of May, and during one winter three fruit buds out of four were killed.

The first experiment of the Messrs. Koepfli was commenced in 1843, when they visited the vineyard of Mr. Longworth, at Cincinnati, and procured one hundred plants. From these they made in 1847 one hundred and ten bottles of wine, and the same year commenced their present vineyard, setting two and one-half acres, from which, in 1850, they made one thousand gallons of wine, and nearly destroyed their vines. Since 1857 a regular account of the product has been kept up to the time of my visit, as follows: 1857, six hundred and sixty-eight gallons; 1858, one hundred and twenty gallons; worst year known; 1859, three hundred and six and one-half gallons; 1860, five hundred and ninety-three gallons; earliest picking, September 4; 1861, seventeen hundred and seventeen gallons; best wine and largest yield; 1862, four hundred and forty-six gallons; grapes dropped badly. This would be an average yield of six hundred and forty gallons per annum, and one hundred and forty-two per acre.

The Messrs. Koepfli consider the prairie preferable to woodland, inasmuch as they are dryer; and believe the shelter of their grove, so far as it goes, to be a positive injury to their vineyard.

In the vicinity of Highland are thirty acres or more of vineyards, but I visited only that of the Messrs. Koepfli.

MASCOUTAH.

Accompanied by Mr. Tice, of our Society, and Messrs. W. T. Miller and John M. Pearson, of Alton, Mr. Husmann and myself, on the 8th of September, visited Mascoutah and its vineyards. Mascoutah is a thriving little town of St. Clair county, some eight miles east of Belleville, on a rich and somewhat level prairie, not very well adapted to the culture of the vine. Messrs. Philip and George C. Eisenmayer, whose kind attentions and hospitality we shared, first showed us their garden plantations and one or two other noteworthy specimens of vine growing in the village, before conducting us to the larger and more distant vineyards. Among these, we note as of special interest a small yard planted with the Delaware. The surface was flat, and the soil a deep black vegetable mould, such as would seem not at all adapted to grape culture; yet here were the Delawares, abundant, beautiful and good. Does this mean that the Delaware needs a richer soil than some other grapes?

The Messrs. Eisenmayer's vineyard is situated on the top of an elevation a few miles south of Mascoutah. It is one of those wooded knolls common in this part of the State, that stand like islands in the sea of prairie, and seem to differ somewhat in soil from the surrounding country, being nearly as rich, but looser and better drained. The

soil was prepared by first plowing sixteen inches deep with four yoke of cattle, then by following with a second plow eight inches deeper, making twenty-four inches in all. The ground thus prepared was planted four years ago, in 1860, with yearling layers, five by six feet apart. They have been cultivated during the fore part of the season by two or three plowings and harrowings, with hoeing in the rows. In October the vines are pruned and laid down. The Herbemont is covered with earth.

Thus far the growing of new plants having been the prime object, training and summer pruning have not been attended to.

The varieties planted are one thousand Norton's Virginia, six hundred Concord, two hundred and seventy-five Herbemont, seventy-five Hartford Prolific, and fifty Clinton, besides varieties. The Concord and Hartford Prolific are preferred for market and the Norton for wine. No diseases have appeared yet, though there are some symptoms of rot on the Concord.

Theodore Englemann, whose Catawba wine is well known among connoisseurs in this part of the Union, cultivates a vineyard immediately adjoining, on a southorn slope of the same hill. Mr. Englemann began here in 1851. The soil was prepared by trenching twenty-four inches deep and planting first six acres of Catawba five by six feet apart; two acres, set later, with Concord and Norton at five by twelve, are trenched to the depth of thirty inches. Our stay was too short to permit us to get a full account of cultivation, etc., but the following statement of Mr. Englemann, and the remarks upon wine making, made in the same connection, will be read with great interest by those who know his eminent practical skill as a wine grower:

"My vineyard is on the southern slope of a rise of ground, near the southern end of Lookingglass Prairie, hardly deserving the name of a hill, though I love to call it so. In front, or south of it, stretches for three or four miles open land, in cultivation, framed in on both sides, east and west, by woodland. North of my vineyard and east of it, on the top and northern slope of the hill, grows the natural forest, affording protection against the north and northwest winds; yet I am by no means sure that this protection is a benefit to the vineyard, as I incline to the opinion that a free circulation of air, even from north and northwest, would be beneficial. Trees are soon cut down, but it takes the term of a man's life to raise them, and for this reason only have I yet saved my trees from the ax.

"My soil is a rich mould to the depth of ten to fourteen inches. The sub-soil is heavy, cohesive clay. It was all trenched twenty-four inches deep before the plants were planted, and my vineyard covers now six acres of ground. I have made wine since 1854, and was always satisfied with its quality—not so with the quantity of the yield. My vineyard suffers more from the diseases to which the Catawba is liable than any other vineyard which I have had an opportunity to

examine, but my wine always compared favorably with the best Catawba wines which I ever tasted. If there was an objection against it, it was a preponderance of aroma in it. The same as the best dishes may be spoiled by a too generous addition of spices, so wine may lose from its quality by an excess of aroma. My wine was, especially by persons not used to the Catawba flavor, often pronounced too rich. It was my practice after the grapes were mashed to let the pomace rest some twelve or eighteen hours before it was brought to the press, and then to press as dry as possible. To avoid the objection referred to, I had concluded in future to press the pomace at once as soon as the grapes were mashed, and not to press so hard. Just then Dr. Gall's treatise on the treatment of wine came into my hands, and I concluded to follow his advice and to try whether the excess of aroma could not be turned to account instead of throwing it away. So, in 1862, for the first time, I added to the must, during fermentation, twenty-five per cent. of sugar water, containing twenty per cent. of sugar. The acid, which in the pure juice, varied from six to seven per mill—the proper standard in a wine of first quality—and I am so well pleased with this result that I am not afraid to challenge competition from wheresoever it may come. I will add that my must, according to Oechsle's scale, generally contains about twenty-one per cent. of sugar; if less, I add the deficiency, and in that way I obtain regularly a wine containing ten to eleven per cent. of alcohol.

"It is not my intention to recommend this method of wine making for general imitation. There is certainly a wide difference in the ripe grape in regard to the admixture or proportions which its rich component parts bear to each other; sometimes they are well balanced; oftener one or the other will predominate, depending on the season, situation, soil, climate, etc., and it requires an observing mind and close application to find out and form a correct idea of the virtues and defects of the produce of a vineyard, and only he who has a clear understanding of it can proceed to improve it according to the rules which science and experience point out to us."

Mr. Englemann's wine thus made was pronounced by the members of the committee very good, and even more palatable than the pure article. Catawba of 1860, made pure, was compared with that of 1863, mixed, and the preference given to the latter. Catawba of four years is, however, not in its best condition, and although the must of that year was the heaviest (80° to 90°) yet obtained by Mr. Englemann, the wine was now a little acid.

The experiment of Mr. Englemann, although we fear it may give less honorable men an excuse for making wines palatable at the expense of flavor and healthfulness, is one worthy the attention of wine growers, who, by reason of an unfavorable season or location, find themselves in possession of grapes unfit for wine.

While the Catawba and Concord wines of Mr. Englemann were found very fine by the committee, the Norton's Virginia was pro-

nounced not as good; in fact, the committee agreed that it could not compare with samples of that noble wine, as made by the Hermann growers. The process of adding sugar water had evidently been overdone, and we could hardly recognize the wine produced by Mr. Englemann as Norton's Virginia.

BELLEVILLE.

In this connection, I give a few notes of a visit to the vineyard of Valentine Huff, near Belleville, made in the summer of 1863. This is of special interest, as one of the oldest as well as best vineyards in the neighborhood.

Louis Huff, the father, about 1846 or 1847, planted two hundred vines on a lot in Belleville, being the first planted in this region. These produced thirteen dollars' worth of fruit the first year. The vineyard now under consideration was planted about 1849, on a southern and southeastern slope of fertile prairie land; a part of the soil was prepared by trenching to the depth of two feet, and a part by a kind of ditch trenching which dug up only half the ground. For poor soil, the first method is here preferred. Five acres were planted, a part in 1849, with Catawba cuttings set four by five, two in a place; a part later with one cutting in a place. The cultivation is plowing one way, across the slope, three or four times a year, and two hoeings in the rows. The low system of training is followed—rye straw being used for tying. Every three or four years old manure is applied to the amount of two forkfuls to a vine. The rot has been the troublesome disease, and the frost damages the lower vineyard. The largest yield, that of 1857, was two thousand gallons, and the lowest one hundred and fifty gallons, worth, up to that time, about two dollars per gallon on an average. Mr. Huff ferments his wine on the husks sufficiently to give it considerable color.

HERMANN.

I visited Hermann on the fifteenth and seventeenth of September. I found the other members of the committee, Mr. Husmann and Dr. Morse, already on the ground and ornamented with rosettes, making themselves useful as officials in the county fair of Gasconade, now become an annual festival of the wine growers of the Missouri. An hour or two spent on the grounds in the afternoon gave me but scanty opportunity to examine the very fine exhibition of grapes which, though less in quantity than last year, had ripened their juices rarely beneath the drouths of the summer of 1864. The Concord was there, big, black and burly, grown equally well on main canes and laterals. This rather contravenes the observation of last year. Magnificent Herbemont bunches, broad-shouldered and compact, shone like blue steel even in the dust and heat of the fair. We noted the Alvey as exceedingly good, and the Clara as very sweet.

Next morning, accompanied by a large party of gentlemen from St. Louis, Illinois and elsewhere, we went down the river to note the progress of the past year in the new vineyard of Mr. Husmann. The Herbemont vines had been laid down and covered during the past winter, and were now loaded with large, compact bunches of just ripening fruit. Nothing more beautiful or better, I believe, has yet been discovered among American grapes. Two rows of Cunningham, not quite so ripe, were very full of fruit. Rulander was very ripe and sweet. Clinton was bearing well, its leaves diseased as usual, without apparent injury to the fruit. Clara and Rebecca were found sweet and good, but not in large quantity. The four hundred Concord vines noted last year as having produced one thousand four hundred and eighty-three dollars up to the third year of their growth, have produced one thousand five hundred pounds of fruit for market, and promised sixty gallons of wine besides. The Delaware did not seem thrifty. Deveraux, here seen for the first time, is like the Herbemont, but the berries are more uniform in size. Lenoir is sweeter, but not so good a bearer.

I may say here that I have been struck, during our examination of varieties, with the strong contrast between the Fox and summer grapes. That I may be better understood, I subjoin a classification, made up from various sources, of American grapes, according to their origin from the *vitis labrusca* or *vitis æstivalis*, between which two the maternity of all valuable native grapes is believed to be shared:

Vitis Labrusca—Fox Grapes. Adirondac, Allen's Hybrid (?), Anna, Arrott, Blood's Black, Concord, Creveling, Cassady, Catawba, Canby's August, Delaware, Diana, Draent Amber, Early Northern Muscadine, Hartford Prolific, Iona, Isabella, Mary Ann, Perkins, To Kalon, Union Village.

Vitis Æstivalis—Summer Grapes. Alvey, Arkansas, Clinton (?), Cunningham, Cynthiana, Deveraux, Elsinburgh, Herbemont, Lenoir, Lincoln, Louisiana, Long, Norton's Virginia, Ohio, Pauline, Rulander, Taylor (?).

It is with a great deal of hesitation I attempt to classify the grapes we have at present under cultivation, as I have grave doubts about the origin of a great many of them. As Mr. Flagg has made the attempt, however, I will make an effort also, as I differ with him in assigning a good many of the varieties he names to the classes which he makes. I think we have at least five if not six distinct species of wild grapes from which our natives have sprung. These are, 1st. The Northern Fox grape—*vitis labrusca.* 2d. The summer grape—*vitis æstivalis.* 3d. The sand or river grape—*vitis* ——. 4th. The winter grape—*vitis cordifolia.* 5th. The Southern Fox—*vitis rotundifolia*, and, perhaps, 6th. The Southern summer grape, which may be only a sub-variety of the summer grape as we find it East and West, but is, nevertheless, the parent of a number of varieties, which distinguish

themselves from the descendants of the Western summer grape by a different foliage, and, also, by their fruit, as the berries are without pulp, much juicier, thin skin and delicacy of flavor. I will now attempt to classify them as I think they belong:

Varieties descended from the Fox Grape. Anna, Adirondac, Arrott, Blood's Black, Brown, Concord, Creveling, Cassady, Cape, Catawba, Canby's August, Cuyahoga, Cloantha, Chippewa, Diana, Draent Amber, Ewing's Seedling, Northern Muscadine, Excelsior, Garrigues, Garber's Albiness, Gravel, Hartford Prolific, Hettie, Iona, Israella, Isabella, Kingsessing, Lydia, Logan, Labe, Maxatawney, Martha, Mary Ann, Marion Port, North Carolina Seedling, Ontario, Pœschel's Mammoth, Perkins, Powell or Bland, To Kalon, Union Village.

Varieties descended from the Western Summer Grape. Arkansas, Baxter, Cynthiana, Norton's Virginia.

Varieties descended from the Sand or River Grape. Clinton, Franklin, Golden Clinton, Taylor.

Descended from the Winter Grape. Oporto.

I do not know that there are any varieties of the Southern Fox in successful cultivation here in the West. The Scuppernong has been tried by me, but found entirely worthless, also the Southern Muscadine, with the same result.

Varieties supposed to be descended from the Southern Summer Grape. Alvey, Clara, Cunningham, Delaware, Devereaux, Elsinburgh, Herbemont, Lenoir, Lincoln, Long, Louisiana, Pauline, Rulander.

Varieties which are hybrids between native and foreign varieties. Rebecca, Rogers' Hybrids, Allen's Hybrid.

Varieties of foreign origin. Alicanthe, Brinkle, Canadian Chief, El Paso, Rosine of Smyrna, Terre Promise.

I cannot altogether agree with the views expressed by my colleague that we have our most valuable varieties from the summer grape; whilst I may fully agree that we have more valuable varieties from the summer grape than from the Fox, yet we have a few from that source which are as valuable as any of those descended from the latter. I refer to the Concord, Cassady, Hartford Prolific, Maxatawney, and may be the Iona and Martha, varieties which I think as valuable as many descended from the Summer and Sand grape. The varieties descended from the Southern Summer grape are more uniformly good, and generally extremely productive, but we must not forget that only those descended from our summer grape have as yet produced the true red wines, which, as medical and so-called stomach wines, are so far superior to all others, whereas those derived from the Southern Summer grape are of the most delicious flavor, and the berries of the latter are more juicy and vinous.—*George Husmann.*

The contrast between these two classes is very marked and distinct, although, as in the case of the Delaware and Taylor, there are occasional difficulties in assigning a variety to its proper class. The Northern Fox grape, according to Darlington, is found from Canada

to Georgia, the summer grape from Connecticut to Florida. The first has a wider range northward and is more hardy. The latter southward, and is less enduring of cold. The same authority gives the growth of the Fox grape as fifteen to twenty feet, whilst that of the summer grape is set down as twenty to thirty feet. The leaves of the Fox grape are described by Gray as "wooly" when young, and "continuing rusty only beneath," whilst the summer grape has "young leaves downy, with loose cobwebby hairs beneath, smootish when old, green above." These latter leaves, for some reason, are much less liable to disease in the West. The bunch of the Fox grape is loose, often small and not shouldered; that of the summer grape often large shouldered and compact. The berry of the Fox grape is sometimes enormously large, generally thick skinned, more or less musky and pulpy. The berry of the summer grape is medium or small, the skin thin, without foxiness or pulp. The Fox grape ripens, according to Gray, in September, the summer grape in October; and as a matter of fact, the early varieties of cultivated grapes are Fox, while those derived from the summer grapes are late.

The summer grapes seem, here at least, more free from disease either of leaf or fruit. The fruit is superior in quality. No fox grape, not even the Delaware, can vie with the Herbemont in excellence as a table grape. Wm. N. White, of Georgia, the State of its origin, pronounced it, in 1857, "best for the table or wine." Downing calls it "a fruit of surpassing excellence." No Fox grape, we think, can produce a wine of greater excellence than some of the varieties of the summer grape; owing, however, to the fact that this class of grapes are not sufficiently hardy to endure northern latitudes, they have not received that extended culture in more southern and favorable localities that they deserve. I believe, therefore, I will do service in enumerating some of them, with such comments as they have elicited.

ALVEY. "Promises highly as a wine grape," says Husmann; "bunch and berry small, black, early, sweet and vinous without pulp, fine flavor, seems to be hardy, healthy and very productive." "In briskness and moderation of sugar" says Dr. Grant, "it resembles the Herbemont; its berries are larger and bunches smaller, but it ripens earlier." "Too tender for vineyard culture" [at the North], says Mr. Fuller. "I believe this is the earliest of the summer grapes, except, perhaps, Lenoir, ripening at Hermann about the middle of August, only moderately vigorous," says Dr. Warder. At Mr. Knox's, rather slender and does not appear to ripen its wood perfectly; the foliage is rather small and persistent; the bunches are small, loose and shouldered, with small, round blue berries that are soft and juicy, with a brisk acid flavor, promising well for wine; it ripens from September fifteenth to the middle of October.

ARKANSAS. "Vigorous grower, very hardy and productive; resembles Norton's Virginia very much; bunch and berry larger and somewhat more juicy."—*Husmann.*

CLINTON. This can be but doubtfully classed here. Its merits as a hardy and excellent wine grape are well known, and when we get beyond that stage in grape progress that confounds the biggest and the best, its merits will give it high place.

CUNNINGHAM. "Bunch very compact and heavy; berry black, round, small, juicy and vinous; free from rot; makes one of the most delicious sweet wines, of great body and exquisite flavor. A somewhat uncertain bearer; needs covering in winter." "Specific gravity of must ninety-five to one hundred and five. Makes a strong, very delicate wine, which often remains sweet after fermentation, and will, I think, command almost any price in market, if made in sufficient quantities." Thus far Mr. Husmann. Last year it was not much liked by Wm. Pœschel, as "tender and an uncertain bearer." Michael Pœschel pronounced it "the best wine grape." With Fred. Noe it was "healthy but not bearing much."

This grape attracted a good deal of attention the past year, as promising a sweet wine, which is still a desideratum to American wine drinkers. Should this promise be fulfilled, the variety will merit and receive great encouragement.

CYNTHIANA. "Vine a strong, vigorous, hardy grower; bunch and berry resembling Norton's Virginia, but larger; very productive and valuable as a wine grape."

"Cynthiana, or Red River, closely resembles Norton's Virginia; specific gravity of the must about the same (ninety-five to one hundred and five). Wine not quite so dark, but of great body and fine flavor. Not much tried yet."—*Husmann.*

I find the following notes of it in our last year's report: "At Mr. Husmann's, 'much like Norton's Virginia, but sweeter and more juicy.' Mr. Pœschel (Michael) thinks it will make more wine than the Norton's Virginia."

"Sour and worthless," says Mr. Fuller in his Grape Culturist, and we are pleasantly reminded of the Æsopian fox, who raised a similar cry against unattainable fruit. So it is with the advocates of the Northern Fox. The grape Fuller describes is not the same as the one I cultivate.—*Husmann.*

DEVEREAUX. "Bunch over a foot long, large, rather loose shouldered; berry resembling Herbemont, below medium, round, black, juicy, little pulp, sweet and vinous, very good, strong grower and very productive."—*Husmann.*

In the *Horticulturist* for 1857, page 458, is a description of what seems to be the same grape, by Wm. N. White:

"The only specimens we have ever seen were from Peters, Hamden & Co., of Atlanta, from which and from three small vines set out this season our description is derived, aided by notes from Dr. Baldwin, of Montgomery, Alabama. It was found in the woods over forty years since, by Samuel M. Devereaux, and first cultivated by himself and his neighbors near Sparta, in this State. As Devereaux kept the stage

house, passengers soon disseminated it, being struck with the wonderful productiveness of the vine. It seems quite distinct in foliage. Young leaves, sub-three-lobed, older ones distinctly lobed. The young leaves and shoots are light green (not brownish, as in the Warren) [Herbemont]. Leaves moderately downy, distinctly arachnoid, hoary instead of fuscous. Bunches quite long (those sent over nine inches), very much shouldered, compact; berries small, skin thin, black, covered with blue bloom; flesh free from pulp and abounding in juice, of a color as darkly red as that of the pokeberry, of a brisk and excellent flavor; quality 'very good;' a prodigious bearer, hence, like the Warren, considerably liable to rot. (This is not the Devereaux of 'Gardening for the South,' which is the true Lenoir.) Ripens about the middle of August. The color of the juice is deeper than that of any other grape we know."

As stated above, this grape was seen by the committee at Hermann for the first time, and found to be of the Herbemont class, but more uniform in the size of its berries. Very productive must, weighing ninety-five degrees; promises highly for wine.

ELSINBURGH. "Small, but of a good quality, early, black, sweet and rich."—*Husmann.*

"A very nice little grape for the desert; perfectly sweet and melting, without pulp; from Salem, New Jersey."—*Downing.*

"It has been uniformly hardy, healthy, and sufficiently but not excessively productive. Size of bunches large, long—often very long—irregularly shouldered. * * * Ripening one week earlier than the Isabella."—*C. W. Grant.*

This grape has not been seen by the committee. Dr. Warder says that at Pittsburgh it "is a prime favorite with Mr. Knox, on account of its hardiness, productiveness and the rich sweetness of its small, dark blue berries, with red juice. The bunches are rather large, loose and shouldered. The grape is desirable for table and for wine."

"Very moderate bearer, identical with Missouri Bird's Eye, I think."—*Husmann.*

HERBEMONT. This grape is one of the best known of the tender Southern varieties of the summer grape, and need not be noticed at length in this connection. Must, eighty-five to ninety-five.

LENOIR. "A fine table grape and makes a good wine, but a somewhat tardy bearer. Bunch and berry rather small; black, sweet and good, without pulp. Specific gravity of must, ninety-five to one hundred and five. A fine, brilliant red wine, of great body and Maderia flavor."—*Husmann.*

"The Lenoir is fully three weeks earlier than the Herbemont in ripening, is much more sugary in flavor, and able to endure much greater severity of cold in winter."—*C. W. Grant.*

Its place of origin, according to Mr. White, as above, is Sumter District, South Carolina.

"The Alvey, Lincoln and Lenoir are probably the best for the

Northern States; and even these are not so good when cultivated here as many indigenous to this section. This class of grapes may properly be called wine grapes, and in sections where they fully ripen they are hardly to be surpassed for making light, delicate wine."—*Fuller's Grape Culturist.*

This grape, as seen last year and this at Hermann, was approved, but not highly, by the committee—appears unproductive.

LINCOLN. "Lincoln is another of the Herbemont group, and for general cultivation is the most valuable of the class, being very productive, ripening early, or considerably before the Isabella, with all of the purity and sugary richness that belongs to the best of the Pinots. Lincoln is a little earlier as well as more productive than the Lenoir, and equally certain in its crops."—*C. W. Grant.*

This grape, too, has not been examined by the committee.

LOUISIANA. "Bunch medium, compact; berry small, round, black, without pulp, juicy, sweet, and vinous; makes an excellent wine, very valuable. Specific gravity of must, ninety-five to one hundred and five. Makes an excellent pale red wine, one of the best of this class, very heavy, with delightful aroma."—*Husmann.*

During our visit last year we were informed that the must of this wine was the heaviest yet tried.

LONG. "Resembles the Cunningham; may be identical with it."—*Husmann.*

"The parent vine," says Mr. White, "was found over thirty years since by Colonel James Long, in the woods of his plantation, near Danielsville, Georgia. * * * Vine of vigorous growth. Leaf, in shape, much like Lenoir, but more apt to be deeply indented; sometimes sub-three-lobed, of large size, thick. Young leaves, at first, very hoary with down, which, in the youngest, is a little fuscous; color of the leaf itself a clear green, with no shade of brown or red; older leaves always more cobwebby than any other cultivated variety, giving a whitish appearance beneath, quite distinct from the yellowish shade of Lenoir. Bunch, somewhat shouldered, very compact, of medium to large size, good ones weighing about twelve ounces. Berries, average larger than Lenoir, the best being a little over one-half inch in diameter. Skin, thin, very dark purple, with a blue bloom. Flesh, tender, very little pulpy, sweet and vinous. Quality, very good."

NORTON'S VIRGINIA. This grape is now too well known and approved as a wine grape to need any extended notice.

OHIO. Downing thinks this a foreign variety, but Mr. White classes it with the summer grapes, although he considers it, like the Elsinburgh, "too small to be desirable." Quality, "very good."

"Worthless with us, as it is subject to mildew, leaf blight and rot."—*Husmann.*

PAULINE. Dr. Grant gives the following description, by A. De Caradeuc, of South Carolina: "Berries, reddish brown, transparent, juicy, very sweet, with very thin skin, about the size of Warren, (Herbemont.)

Bunches mostly loose, sometimes compact, shouldered and large; a most delicious table grape, never rots. In dry weather, if suffered to remain on the vine, will wither and dry into raisins. Leaves, large, round, dented, curved at the edges, yellowish green, the ends of the young branches having a peculiar brownish appearance; buds very prominent. Evidently of American origin and not of European, as its former name (Georgia Burgundy) would imply. This grape is able to rank as No. one for the table, being equal in flavor and delicacy to any European variety. The wine made from it is delicious, and will keep sound for a long time after the bottle is opened and used; a moderate bearer."

RULANDER. "Bunch heavy, compact, shouldered; berry small, without pulp; sweet and good; promises to be valuable for wine."

The thorough trial of all these and related varieties will, I think, bring into use varieties more satisfactory, both for wine and the table, than have been produced from the Fox grapes. The offense of the *vitis labrusca* is rank; it smells to heaven, and its aciduous, pulpy sack of immatured juices hardly disappears beneath the warm sun of this and more southern localities. In refreshing contrast stand the summer grapes, full of sweet juices and free of unpleasant odors, only not big.

But to return from this long digression to Hermann and its vineyards.

The vineyard of Mr. Wütrich we found in fine cultivation. The Herbemont vines had received winter protection, and had a splendid crop of fruit. The Concords were very fine and the Catawbas good.

Michael Pœschel's new vineyard was, if possible, under better culture than last year. The Norton and Concord vines looked exceedingly well. Mr. Pœschel was just completing a new wine cellar, fifty-six feet in length, by twenty-two wide and ten high, arched, with eight feet of earth on top of the arch, and a building for wine press, etc., over the whole. Ventilation is secured by large flues, and the only door opens to the northward.

The day after the fair Mr. Husmann and myself started up the river on a reconnoissance, and visited first the vineyard of Joseph Spirg, at Cole's creek, four miles above Hermann. The exposures are from east to south and southwest, on an alluvial soil, with a rather stiff, yellow clay sub-soil. The ground was prepared in the older part of the vineyard by ditch trenching, and in the newer by plowing to the depth of eighteen inches; cultivation by plow, followed by the cultivator and hoe, has been thorough under the present proprietor's care. The summer pruning this year was varied according to the need of vines after the winter's cold. There was no protection, nor loosening from the single stakes used for training, and the vines were consequently much injured down to the snow line. Vines accidentally fallen on the ground before the severe cold, were in fine condition and full of fruit.

The vineyard is large, comprising eighteen acres of vines, mostly Catawbas, with a few Norton's. The vines are very healthy; little leaf blight or rot is apparent. On account of the frost there is only about one-third of a crop. The grapes are made into wine. An arched cellar of stone, fitted with casks, of a total capacity of six thousand seven hundred gallons, stands ready to give a cool reception to the must.

Mr. Spirg has lately purchased this vineyard, but for a beginner has done well.

On Smith's Island, nearly opposite, on a nearly level sandy soil, Jacob Graff has tried the experiment of a vineyard among the cottonwoods. The vines were planted eight by six, in holes two feet across, and consist mostly of Norton's Virginia, with some Catawba, Concord, Herbemont and Delaware. With the exception of some trouble from the leaf roller, the vines are free from disease. The oldest are four, others three and two years old.

The upper part of the vineyard, in eight feet of sand, did not make so strong a growth, but in the lower part, where, at the depth of one foot, there are six inces of decomposed vegetable matter, the growth is very strong and good. The Norton's Virginia grapes were already gathered. The fruit was plump and sweet. The Delawares left on the vines were exceedingly sweet, and the Herbemont did not lose its character.

As a sample of what could be done under the worst possible conditions, this vineyard was not the least interesting of those we visited, and the cordial reception we received was not less hearty than that of the vintners of the hills.

In conclusion, I subjoin some reports I received in Illinois concerning the effect of the cold of January 1st and 2d, 1864, and in grape vines generally, and in varieties.

D. B. Weir, Lacon, Marshall county, says Catawba, Isabella, Diana, Union Village, Elsinburgh, were all killed to the snow line; Concord had about half the fruit buds killed, but vines looked sound to the end of the canes; Delaware, old vines, the same, or a little better than the Concord, but many of the vines planted the spring before were killed. The vine looked sound but the roots were entirely dead. I suppose this was partly owing to the severe drouth the summer before. Hartford Prolific, about half the vines and three-fourths the fruit buds killed, but still they make quite a crop of fruit this year; To Kalon, about the same; Norton's Virginia, Taylor and Clara, but very little hurt; Clinton, I think, not any. I am speaking of vines left entirely exposed.

J. M. Vandervort, Belle Plain, Marshall county, found Concord, Delaware, Clinton and Hartford Prolific, hardy; Isabella, half hardy, and Catawba tender.

R. L. F. Bourland, of Peoria, reports all the exposed parts killed; none equal to the cold of January.

Charles W. Murtfeldt, of Rockford, found Clinton hardy and Isabella half hardy.

J. W. Talman, of Winnebago, Winnebago county, says Clinton grapes proved perfectly hardy for any country south of McKenzie river. To test its hardiness I left one vine as it grew, except trimming, on the south side of my house, freely and fully exposed to southern and western winds; also one or more on the top of the garden fence, without any protection whatever. In the spring I could perceive no difference in the vigor or fruitfulness of them and of those protected in the usual manner of laying in the ground and covering with dirt. None of the vines bore as well as the year before.

A. C. Hammond, of Warsaw, Hancock county, adds that the Clinton is the only grape that has passed the ordeal uninjured in fruit or wood, all others being killed to the snow line.

J. J. Halsted, of Tuscola, Douglas county, finds the Concord hardy and the Isabella and Delaware half hardy.

F. K. Phœnix, of Bloomington, McLean county, says: Grapes much hurt when left exposed; Concord, on high ground, with me, was but little hurt. Our other vines were mostly cut to the ground in the fall for cuttings, and so I cannot testify of our experience.

H. P. Brayshaw, of Duquoin, Perry county, reckons Clinton and Concord hardy, and Norton's Virginia and Catawba half hardy.

Wm. M. Jeffrey, of Jones' creek, Randolph county, found Catawba and Isabella hardy.

Adam Buck, of South Pass, Union county, says, "vines, in many cases, winter-killed."

J. P. Geisler, of Meier, Wabash county, says, "vines almost dead. No grapes."

J. Ellsworth, of Hoylton, Washington county, reports Isabella and Catawba were injured some, but the Concord, Clinton, Northern Muscadine, Hartford Prolific and Delaware were uninjured.

Thomas S. Kennedy, of Louisville, Kentucky, gives some interesting testimony. "Out of some forty kinds of grapes which I am cultivating at my residence, near this city, the Delaware and Clinton were the only two kinds that were not seriously injured by last winter's cold. The others had the fruit buds or wood more or less killed, and a few bearing vines, of which I remember Cassady, Allen's Hybrid, Herbemont, Union Village, Lenoir, Scuppernong, Rebecca, Raabe, Clara and some of Rogers' numbers were killed down to the ground; Anna, Diana, Logan, Concord, Elsinburgh, Catawba, Golden Clinton, Marion Port, Alexander, Taylor's Bullitt, York Madeira, etc., had fruit buds injured; Logan, Venango and Hartford Prolific bore half crops; the others matured no crop."

William Muir, of Fox creek, Missouri, reports Clinton, Iden, Waterloo and Ozark Seedling as hardy. "As to tender and half hardy varieties, in sixty other sorts there was but little choice when unprotected."

The sum of all this is, that the Clinton is the hardiest grape cultivated, and Delaware and Concord probably stand next. The Taylor has proved at Hermann fully as hardy as the Clinton, and produced a fine crop of well ripened fruit. It promises highly as a wine grape.

W. C. FLAGG, *Chairman Committee.*

SEVENTH ANNUAL MEETING

OF THE

MISSOURI STATE HORTICULTURAL SOCIETY.

JANUARY 9, 1866.

The President, Henry T. Mudd, called the Society to order.
Prayer was offered by Rev. Mr. Peabody.
President Mudd addressed the Society as follows:

ADDRESS OF MR. HENRY T. MUDD.

GENTLEMEN: Again we are permitted, under many evidences of the continued favor of Him who doeth all things well, to assemble in convention for the seventh annual meeting of the Missouri State Horticultural Society.

The year that has passed since our last meeting has been a remarkably fruitful one—to the husbandman in the abundant yield of his fields, to the orchardist in fair crops on all his trees, to the vintner in increased production of delicious grapes and cellars well stored with generous wine, and for all prices amply remunerating for cost and labor of production.

To the world the past year has been fruitful in those remarkable events which go to make history of nations and times. In none have these events been of greater importance than our own favored land. With us it has witnessed the majesty and power of a free people in the suppression and overthrow of the most stupendous and powerful rebellion ever organized against a popular and beneficient government. It has witnessed, in the violent removal of the recently chosen Chief Magistrate, the most diabolical assassination that has ever disgraced the annals of crime. It has seen, not only his own nation and people stricken with a grief overwhelming, but has seen a world in mourning over the bier of this fallen chief of a free people. Towards its close it witnessed the final act consummating the emancipation of four millions of people from the bonds and chains of a chattel slavery, and in this emancipation of our slaves it has witnessed an

advanced and improved civilization, in our own emancipation from the thraldom of an institution which was the poison of our social system, the blight of our material progress and prosperity, the nursery of treason, and as a relic of the barbarism of the past, the disgrace of a people claiming to be inspired by a love of liberty and to be governed by principles of enlightened freedom. I trust I may also say, it has witnessed the inauguration in the hearts of our people of an earnest desire to bury the animosities of the recent strife, to bind up the wounds of the late conflict, to cement in bonds of affection and confidence all parts of our common country, and thus become a united, prosperous and happy people.

The lifting of the clouds of war from our State has found our people manifesting an increasing interest in the arts and employments of peace. It has induced a tide of emigration to flow toward us which must largely augment the force in present fields of labor, and will, no doubt, develop new industries and enterprises from the vast resources of the State.

On all sides we see largely increasing attention given to the planting of orchards and vineyards. I doubt not each one of you are daily approached by some anxious inquirer, who wants to know the best varieties of the various kinds of fruit, and where this or that article can be procured of the best quality on best terms. It should be our purpose carefully to revise and correct our lists of fruits at this meeting. To this I invoke your most patient consideration. Never in the prior history of our State was it, perhaps never in the future will it be, so important to the fruit growers of the State, that the best possible lists for general cultivation be presented, as at this meeting. Our propagators want now to know what will be wanted the next few years, and thousands of planters would now know what varieties promise best reward.

The lists being arranged, it is no part of the business of this Society to say at what respectable nursery or nurseries the trees or plants shall be obtained, but I would respectfully submit for your consideration, whether or not we shall at this time place on record and give to the public our most unqualified condemnation of the tree peddler. Have they not done more to injure the fruit growers of the West than have blight and frost? A planter who knows little about the varieties he should plant for profitable culture, had better admit a rattlesnake to his house than an oily tongued tree peddler to his confidence. I have been greatly surprised to see with what avidity gentlemen of intelligence in other departments of business, will give their orders for trees and plants to these adventurers, at higher prices and of poorer quality than could be obtained within a few miles of home, of regular nurserymen, who have reputation to make or lose.

The attention of those interested in growing fruits for market is invited to the consideration of a project for the establishing, by a stock company, of a fruit bazaar or exchange, where the producer

and consumer of fruits and wines may be brought together—where the one may always expect to find a fair market, and the other may always expect to find the best of those articles the country may produce. It is believed this enterprise may be so organized as to be remunerative to the stockholder, and of vast advantage to the fruit grower and consumer, in the increased facilities it may afford for the exchange of products.

The American Pomological Society will hold its next biennial meeting in this city. It will probably be in the month of September next. It will be expected, and reasonably so, too, that the Western horticultural societies shall see that all necessary arrangements be made for the proper accommodation of that convention. To this end the societies of our neighboring State have, at their recent annual meetings, appointed committees to act in concert with such others as may be chosen for this purpose. Certainly none should feel under greater obligations to give their careful consideration, earnest labors and generous support to the successful accomplishment of this purpose than should the members of this Society. The people of St. Louis, ever ready to do their whole duty on all important occasions, will not be unmindful of their past or to their future history, if we but properly present the importance of this convention to their consideration.

Since our last meeting a number of prominent and useful co-laborers in the cause of agricultural and horticultural improvement have been taken from us. In the West we shall miss more than any other, Cyrus R. Overman, ex-President of the Illinois State Horticultural Society. Devoted, earnest and active in all his undertakings, just and fair in all his dealings, his sterling worth endeared him to a large circle of friends, who deeply feel his loss.

The inefficiency and incompetency of the head of the Department of Agriculture having become notorious, we find the leading agriculturists of the country engaged in an earnest effort to induce the President to place in charge of that department one who may enlist the confidence and coöperation of the friends of agricultural improvement. In this movement the horticultural societies of Ohio, Illinois, and, perhaps, of other States, have adopted resolutions memorializing the President, asking this change. Believing the interests of agriculture demand the change, and that we should neglect no opportunity of serving a good cause, I invite your attention.

The transactions of our last meeting are in type, and will be ready for delivery as soon as possible after the transactions of this convention may be placed in hands of the Public Printer. They will be issued in one volume, together with the transactions of the State Board of Agriculture, the reports of county societies, and a general view of the agriculture of our State. Giving, as it will, much information as to the condition and prospects of agriculture and horticulture throughout the State, it is believed it will prove a valuable addition to the libraries of our members.

I trust you will excuse a word personal. You have, by your kind partiality, three times called me to preside over your deliberations, and learning that it was the purpose of some over partial friends to re-elect me for the ensuing year, I have felt it due to you that I present a few reasons why this should not be so. The position of President of the Missouri State Horticultural Society is one of which any member thereof may justly be very proud, and I feel that the great honor of having been three times chosen to that position is quite as much, if not greatly more than any merits I possess, or any services I may have rendered, should command. Again, I have recently been chosen President of the State Board of Agriculture, and, as such, will be engaged in a somewhat similar field of labor, in which the cause of horticultural improvement would engage your President. Would you not probably secure the more active services of some other friend of the cause, by giving him the position I now occupy? Finally, as you have many members whose abilities to serve you acceptably as President are far greater than are mine, and who ought to be ambitious of the honor of doing so, does not the interest of the cause demand that the change be made?

Mr. Colman: I see some of the members are paying their annual fee of membership, and I wish to offer a resolution at this time so that there may be no trouble hereafter. I move that the annual fee of membership to this Society shall be two dollars instead of one, and that the by-laws of the Society be so amended. The reason that I offer this resolution is, that the fee of one dollar is not sufficient to defray the actual expenses of the Society. I wish that the fee of membership shall defray these expenses and no more. It seems to me no fruit grower can object to paying the sum of two dollars. It is my wish, and the wish of others of this Society, to have the proceedings reported in full and that they be published at large. It is not enough that we come here to enlighten ourselves; we want the great reading public to know what we are doing. We want them to learn what fruits are recommended by the fruit growers of the country, and what are worthy of cultivation; and we are not able to employ reporters with an initiation fee of simply one dollar, but by paying a fee of two dollars we shall be able to do so. We have here a couple of excellent reporters, and for one I am very anxious that the proceedings be taken down in full, and by adopting this plan it can be done.

Dr. Morse: Heretofore we have been in the habit of subscribing to meet our expenses. Members, after paying their annual fee, have subscribed from two to ten dollars each to pay for publishing the proceedings. I am in favor of the resolution of Mr. Colman. Hereafter the State will publish our proceedings, and we can well afford to pay the two dollars for the purpose named.

Rev. Mr. Peabody: I am in favor of the resolution, but I would inquire whether there is not a difficulty in the way. We have here

gentlemen from other States; here are those belonging to the Illinois Society, who pay their own fees, and it may be that they will object to paying two dollars here; but I am in favor of the resolution, if there is no such difficulty in the way.

Mr. Votaw: I wish to speak for Illinois. I belong to the Illinois Horticultural Society. We pay two dollars there, and I do not think they will object to paying two dollars here, as they take an active part in our Society and feel the same interest in it that we do.

Mr. Jordan: As Chairman of the Business Committee, I have written out a resolution to this effect: That our annual fee of membership be raised to two dollars. I am in favor of it. I wish to state, also, that I am a member of the Illinois State Horticultural Society. We pay two dollars there, and I do not think there will be any grumbling if we require the same.

Mr. Clagett: I would make a suggestion which will, perhaps, save some labor and trouble. A great many will be coming in and will hand in the usual fee of one dollar, and the action of the Society will have to be explained to them. I rise to suggest that we postpone the final action until to-morrow. I have no doubt the resolution will pass, but I think it would be well to postpone it.

The motion was carried.

The President: The first business in order is the reports of officers.

The Recording Secretary of the Society, Mr. Muir, then read his annual report, as follows:

REPORT OF SECRETARY.

The annual meeting of our Society reminds us of the lapse of time and the changes in our circumstances and prospects since we last met here. The clang of arms, the din of war, the feverish excitement consequent on our state of anxiety have passed away, and we can now calmly contemplate our destinies and our duties, and set about the work to which our Society is more especially dedicated. The reports that will be presented during our session will call particular attention to specific duties in connection with the labors of this Society. To two or three features of our present condition we will briefly call attention. To one of these there will be no indelicacy in my calling attention, when I state that my individual habits of thought and action, my domestic relations, my social circumstances and political ideas, all utterly prevent my having any ultimate personal design in the case. I refer to the State, in its governmental capacity, maintaining an individual so as to devote his entire time to the interests of agriculture and its kindred branches. We may call the office by any name we please—State Commissioner or State Secretary of Agriculture, or anything else; but he shall have the cognizance of those vastly important interests, and devote himself thereto. It is better that one person have the entire work, and

nothing else, and be amply paid for his services, than that there be a commissioner for this, and a secretary for that, and a president for the next, than to have the time and attention of so many directed to a work that encroaches upon their time and resources with the proper direct responsibility, or remuneration for their services, so that we have many as victims to the interest of the whole, instead of one who will do up the work in the proper time and the proper manner. The division of labor shows that one person can be much more efficient when his whole energies are devoted to a given subject, than when several press themselves upon his time and attention. The State Board, State Horticultural Society, State colleges, and all of that class, can well be put under one controlling mind, and be more successful than isolated action ever can, and we have the example in the State banks, railroads and education.

The subject of a horticultural bazaar, alluded to in a former report, and taken up in the columns of the *Rural World* by a recent writer, is worthy the attention of the Society.

The approaching session of the American Pomological Society opens up new duties and pleasures to us, and it seems one of those occasions which commend themselves to our consideration as seldom occurring in the history of a people.

The peculiar juncture of our national affairs in which the meeting takes place here, points to its vast importance. The opportunity it offers of bringing our amazing horticultural resources before the whole people, points to its importance. The opportunity it offers of illustrating the whole-souled, genuine unselfishness of the Western character, points to its importance. The opportunity it will offer to capitalists, railroad companies and landed proprietors to exhibit our limitless resources as a fruit growing State, points to its importance. The order that will be brought out of our somewhat confused Western pomology, points to its importance, and our hope is that this Society and the community will be fully up to its duty. Too much public attention cannot be called to the subject, and we know that the appropriate machinery will be put in motion to give effect to this action.

We present copies of the bi-monthly report of the agricultural department.

Mr. Cozzens: From the number that are coming in our room is not sufficiently large for our accommodation. Would it not be well to take into consideration the propriety of removing to a large room, which I understand we can have?

Rev. Mr. Peabody: I move that when we adjourn we adjourn to meet in the Court of Common Pleas room, this afternoon. Carried.

Mr. Colman: I move that the President's address be referred to a select committee of three, to report upon the points therein mentioned. Carried.

The following members were appointed: N. J. Colman, Dr. W. S. Dyer and C. M. Saxton.

Mr. Jordan: As Chairman of the Business Committee, I beg leave to report that this Society meet at half-past nine o'clock and adjourn at half past twelve; meet again at two o'clock, P. M., and adjourn at five o'clock, P. M.; in the evening meet at seven, P. M., and adjourn at pleasure.

Mr. Colman: I move that the report of the Business Committee, in regard to the time of meeting, be made one of the permanent by-laws of this Society. Carried.

SHAW'S BOTANICAL GARDEN.

The special committee appointed to visit the Missouri Botanical Garden of Henry Shaw, Esq., made, through their chairman, the following interesting report:

The committee appointed at the last meeting of the State Horticultural Society to visit the Missouri Botanical Garden and confer with Henry Shaw, Esq., the indefatigable originator and endower of this invaluable institution, beg leave to report that they visited the garden on the 25th of October, and were most kindly and hospitably received by Mr. Shaw, and shown over the beautiful and extensive grounds and buildings. We took copious notes on the spot, but the more we reflected on the subject, the more utterly impossible we found it to give an adequate idea of the establishment from the visit of a few hours, when it took a scientific gentleman two years to simply catalogue the plants, trees, etc.

It may not be out of place to say that Mr. Shaw aims at the collecting of hardy plants and the illustration of their botanical relations. The arboretum is extensive, occupying twenty-six acres, and is beautifully laid out. He has found twenty-two varieties of the pine hardy in this climate and six varieties not hardy; there are twelve varieties of magnolia. His experiments with live fences are quite interesting. Six acres are devoted to a fruitaceum, to which but little has been done from having been so much engaged with the other departments. In this are some vines, pears, etc., and we notice a fact to illustrate the interest Mr. Shaw takes in experiment and the culture of fruit. That he has paved a very extended area under the roots of his dwarf pear trees, which are espalier trained, in order to prevent the blight. The views of the Society in forming a department for the illustration of pomology, were stated to Mr. Shaw, with all of which he most fully accorded, and from the view of the grounds, etc., your committee venture to make the following suggestions to the Society:

That a permanent committee be appointed to take charge of the Pomological Department of the Missouri Botanical Garden, who, with the advice and consent of Mr. Shaw, will lay off the grounds appropriated thereto, for the purpose of illustrating pomology. That they

shall endeavor to obtain by donation two trees of each of the several varieties of apples, pears and plums, with such small fruits, etc., as may be adapted to the soil, etc. That they shall plant, label, prune and attend such trees, and make out plats and catalogues, to render the trees of easy identification. That the indestructive label of Wade & Cord will be attached to each tree or plant, row and section.

We suggest that a person be selected by the Society to receive and work such buds and grafts of varieties as it may be impossible to obtain except in that condition.

We regret that we are still compelled to look for a suitable locality for the illustration of the grape, the peach and the cherry, and it is with feelings of regret that we cannot recommend this location for more than a few varieties of these fruits.

The fine college buildings, with the museum, lecture room and library, lead us to suggest that the Society should take active steps to form a horticultural library, to be placed, with the consent and advice of Mr. Shaw, in the library, so as to form a repository of the horticultural literature of the time, and that said committee be required to have all pamphlets, etc., they deem worthy of preservation bound and catalogued.

That said committee shall present a report of their proceedings, with catalogue of trees, etc., books, etc., to be incorporated with the proceedings of this Society.

That the Society shall from time to time vote such amounts of money as shall bear the necessary expenses of all but the manual labor of the pomological department.

The entire grounds, the greenhouses, etc., are open to the public, on Wednesdays and Fridays, and all but the greenhouses open on Sabbaths, and we commend this place to the attention of the members of the Society, and their friends and visitors, as one of the most beautiful and instructive places they can visit, and rejoice to think that a street railroad will make it of easy access at no distant day.

Dr. Spaulding: There are some Illinois friends who take great interest in this subject. Mr. Shaw is in want of advice in this matter, and I move that it be laid upon the table, to be called up at a future day.

The report was laid upon the table.

The Society then adjourned to meet at two o'clock, P. M., in the Common Pleas Court room.

AFTERNOON OF THE FIRST DAY.

Vice President Smith in the chair.

Dr. Edwards then read communications from Marshall P. Wilder and Dr. Worden, President and Vice President of the American Pomological Society, in relation to a proposed meeting of that society in this city the present year, and suggested that the members of this

association consult together as to the proper time and place for holding the meeting of that Society.

N. J. Colman commented upon the importance of fixing a proper time for the meeting of the American Pomological Society, the great advantages which will accrue to the city and State by having the fruit growers of the East visit St. Louis, and see the capabilities of Missouri and Illinois for fruit growing, recommended the first week in September as the time for holding the meeting, and preferred the Mercantile Library Hall as the place of meeting, and thought it very advantageous if the American Pomological Society could have its meeting the week preceding the fair of the St. Louis Agricultural and Mechanical Association. Mr. Colman also read a letter from M. L. Dunlap, with relation to the same meeting.

After some further remarks by Dr. Edwards, upon motion of Dr. Clagett, it was voted that a committee of five be appointed to consider this subject, and report at this meeting.

The President appointed on this committee Dr. H. Clagett, Dr. B. F. Edwards, N. J. Colman, Charles Peabody and B. Smith.

Mr. Muir, Chairman of Committee on Entomology, reported.

Dr. Spaulding: I would suggest a correction in the report read; where it speaks of the leaf roller, I suppose he means the leaf folder; they are two very distinct insects.

Rev. Peabody: I do not expect to show any light upon this subject. I rise simply to inquire if there is in the experience of any of the members any method to prevent the apple borer from getting into the tree?

Mr. Colman: I can tell the gentleman the way, and the only way to get rid of the borer. Follow them up, not exactly with a sharp stick, but with a *sharp wire*. Pierce him in his hole. This is the only way to get rid of him.

Mr. Peabody: My question was not how to get rid of the borer, but how to prevent his presence in the tree.

Mr. Huggins: I will state my method of keeping the borer out of my trees, and also my mode of killing them, or getting them out when they get into the tree. To keep them out I wash my trees with weak lye, no matter how made; I use sal soda. Washing the tree in this manner keeps the tree healthy, and I find prevents the borer from doing his work. If from neglect I find the borer gets into the tree, I take my knife and clear away the rough bark; I then, instead of using a wire, take an apple sprout, which is always at hand, and run into the hole, and kill the worm which the sprout is sure to find. I find that the sprout is better than the wire. The worm does not always work in a straight line. The sprout is yielding and will follow the windings of the hole, while the wire is not thus yielding. The apple sprout is always at hand, and if my friends will try it, I think they will find it superior to the wire.

Mr. Quinette: As far as my experience goes, the best plan to pre-

vent the borer, is to give your trees good cultivation. Keep them in a thrifty condition and you will be troubled but little with the borer.

Mr. Huggins: I would like to correct a wrong impression. The borer will get into a thrifty tree. The fact that the tree is thrifty will not keep the borer out. A thrifty tree has more power to resist and survive any injury that the tree may sustain from the depredations of the borer.

Mr. Quinette; A tree that is on the decline you will find has ten borers where a healthy tree has one.

Mr. Huggins: Do I understand the gentleman to speak of peach trees?

Mr. Quinette: I speak of apple trees.

Mr. Dyer: I understand gentlemen to say that the leaf folder and the leaf roller are two distinct insects. I would be glad if any gentleman here can point out that difference.

Dr. Edwards: I can answer Dr. Dyer. I would assure him that they are two distinct insects. My son first called my attention to the fact in my vineyard. The work of these two depredators were there apparent, the leaf folder and leaf roller. But the leaf folder operated in my vineyard most freely.

Mr. Jordan: The leaf roller rolls the leaf up. The leaf folder laps the leaf over. They are very distinct in their habits and character.

Mr. Smith: They are distinct insects. They depredate upon the apple, plum and quince.

Dr. Spaulding: As I made the suggestion in regard to the leaf folder and leaf roller, I will state that the leaf folder is confined to the grape. The leaf roller preys indiscriminately. One difficulty in the cultivation of the quince, is this leaf roller. They are entirely distinct insects, as every one will see, if they look into the character and habits of these depredators. One rolls up the leaf, the other folds it. The leaf folder, during most of the time, lives in his leaf house. He occasionally comes out to commit depredations.

Rev. Mr. Peabody: Now what I want to come at, is the best method to get at these depredators and destroy them. How can we keep them off the quince? Is there any way to get them, except going to work and pull them off? I would like to get at the facts in the case.

Mr. Muir: The suggestion of Mr. Spaulding, with reference to the terms, leaf folder and leaf roller, was proper. I inadvertently used the wrong term in reading. They are evidently two distinct insects. I have applied soap water and sulphur, with success, to the quince. A friend of mine has a machine, which cost him fifty dollars, with which to apply this wash, and succeeds with it.

Dr. Edwards: We are beginning to raise a good many pears. I would like to know whether the borer preys upon the pear as he does upon the quince. Is it necessary to examine our pear trees for the borer? If so, I would like to know it. I suppose there are some here who can tell us.

Mr. Colman: I have been cultivating pears for a number of years, and never have been troubled with the borer.

On motion of N. J. Colman, the meeting proceeded to the consideration of "evergreens," and the preparation of a list of evergreens to be recommended to the public for general cultivation, it being deemed necessary that those recommended should be, in all respects, the best of their class.

Dr. Spaulding recommended the Norway spruce, because of its easy propagation, its rapid growth and great hardiness. It retains its color, does not brown, and answers all the purposes of the evergreen. There is no evergreen so good as the Norway spruce. There are others that are good, but none come up to this.

Mr. Smith: When Mr. Spaulding recommended the Norway spruce as the best evergreen, I believe he was right. It is of beautiful form, dense foliage, easily propagated, etc. I recommend the Scotch pine because it is *second* best. My reasons are, that it is dense in foliage, exceedingly hardy, and holds its color well. It is easily transplanted. My Scotch pines look green and bright, while the Austrian pines look as if a fire had been through them. The Austrian pine does not answer the purposes of an evergreen. In the summer it looks very well, but in the winter it does not retain its color. But I like the white pine. The American arbor vitæ is a very excellent evergreen. You can make it grow in any shape you please, and it is easy to transplant. The Hemlock is also a fine tree; keeps it color well and answers the purpose of an evergreen very well.

Mr. Kelly: I am sorry to hear such a bad character given to the Austrian pine. If there is any disposition to show redness at this season of the year, I must say it is not so with mine. It is one of the finest evergreens, not excepting the Scotch pine. Give me the Austrian pine. I think that any one who will go out to the Bellefontaine Cemetery can satisfy himself with regard to the beauty of the Austrian pine.

Mr. Jordan: The tree does not obtain its beauty until it reaches a considerable size. It is the king of evergreens—sure to grow. Some which I planted did not grow well at first, but these same trees, last year, grew well. The Scotch pine is also a very fine tree. The Siberian arbor vitæ is also one of the fine evergreens. It would be well to visit some of our gardens if we would see the trees in all their beauty.

Mr. Spaulding: I am not very friendly to the arbor vitæ. I would correct the gentleman when he calls the arbor vitæ the same as the white cedar. They are not identical. I do not esteem them very highly. I believe the Siberian arbor vitæ is better than either. The American balsam fir is a very pretty tree when young, but as they grow older they become ragged and less beautiful; but this does not seem to be the case in Alton. There are, near Alton, two or three of the most magnificent trees of this variety—the American silver fir or

balsam fir—that I ever saw. Some of them are fifty feet high, in perfect health and present no appearance of decay at all. If they will succeed elsewhere as there, they are desirable; but if the same objection as in the Eastern States is raised against them here, they are not desirable. I do not think that our Alton friends have sufficient experience to recommend them. If there is any other information in regard to them we would like to know it.

Mr. Huggins: I just wish to remark that in order to give due weight to the statements of gentlemen in regard to shade trees, it is of consequence that we know the locality of the speaker, the nature of the soil and mode of cultivation adopted. We know that certain fruit trees do not do well in one place, while they might do well in another. The same may be true of evergreens. I think if some of you could visit Bloomington and see the Austrian pines there, you would certainly agree with me in pronouncing it one of the prettiest of evergreens.

Mr. Colman: Although I am a young man, I expect that I have transplanted more evergreens than any man in Missouri. I have not transplanted them by the tens of thousands, but by the hundreds of thousands. I have been engaged in this business for the last ten or fifteen years. My object in bringing up this matter was to let the people know the great ease with which evergreens can be transplanted; they can be transplanted as easily as apple trees. There is a wrong impression in regard to transplanting evergreens. The impression is that few persons can transplant them with any assurance of their living. I know a man who came to my nursery who said he had spent five hundred dollars for evergreens, and had not been successful in growing any. I want to disabuse the minds of many that these evergreens will die when transplanted; the reason that they die is that they have been brought a thousand miles, and perhaps were destitute of life when put into the ground, the sap had ceased to flow, and of course they will not grow. But take the proper course and there is no difficulty in making them live. And there is another thing which should be considered—the manner of planting. If we dig a little hole in the hard ground and stick in the evergreen as we would put down a post, we cannot expect it to live. We could not, under such circumstances, grow a hill of potatoes. Must there not be moisture? Must not the soil about our trees be cultivated? When I plant evergreens I plant them in clusters. I spade a rod, more or less, around, and spade two spades deep; then the soil is mellow; there is moisture in it; every tree will live. You cannot have them do well if you stick them in the sod as you stick down a post. There is another reason: it adorns the country; it makes the lawn a pleasure to behold; it enhances the value of property; it is beneficial in a moral and social aspect and affects greatly the whole community. The sooner we adorn our homes in this manner the sooner we shall elevate the public mind to a proper standard. We must do it; their influence upon the rising generation is in the highest degree beneficial. The reason our

young men are disposed to leave the country and come to the city is because our homes are not made sufficiently attractive. We should make home a pleasant and happy place. Now, sir, this Society owes a duty to the community to educate the people up to this standard, by recommending the planting of these trees. There is nothing calculated to produce a happier effect upon home than to surround it with evergreens, and when the snows are upon the ground, we look out upon them and are reminded of time and eternity. Now, sir, in regard to the varieties. It is not necessary to plant all those which have been named here. The first on the list is the Norway spruce; second, the Scotch pine; then the white pine; then the Hemlock spruce—they have nothing in Europe that surpasses it. In my own native State they grow wild in the woods; nobody thought of planting it. It is not appreciated here as it ought to be.

Mr. Spaulding: Is it difficult to transplant?

Mr. Colman: No, sir. It is not as tenacious of life as some of the other evergreens, but it is not difficult to transplant. I would also recommend the American arbor vitæ. It grows up in a fine shape, and answers all the purposes of an evergreen. The Siberian arbor vitæ is worthy of a place in the list. In regard to the Austrian pine, that, for general cultivation, is the last I would recommend. I have transplanted it by the thousand. It is difficult to transplant, as its roots have but few fibres. It does better in the nursery. I have stated that this is the last evergreen that I would recommend, although it is a beautiful tree, almost as beautiful as any of them. The most rapid growing pines are the Scotch pine and white pine; they run way ahead of the Norway spruce; they are hardy, tenacious of life and worthy of being cultivated.

Perhaps I may speak, while up, of the time of transplanting. I do not think it makes much matter about the day, week or month. The only point is to keep the roots moist. I would say the Austrian pines should be transplanted just when they have the greatest vigor of life; just when they are pushing out their buds in spring. Then they are as certain to live as any of the other evergreens. I believe it is better to transplant all evergreens just as they are beginning to push in the spring. I have planted a great many thousand this spring, and I do not believe I have lost twenty of the number. Everybody can plant them, if they will, and those who do will never regret it.

Mr. Smith: With regard to the time of transplanting evergreens, I will state that some few years ago we did not have evergreens in our nurseries, and we sent to Michigan, to a nurseryman there, and got a car load of them. They arrived on the fourth day of July. I transplanted them in my grounds, and most of them grew. I was so well pleased with them that I sent for another car load, which arrived in August. I went on and transplanted them. The people said they would die. After setting them out through the town, wherever I was permitted, I took the refuse plants and saved three-fourths of them.

The last car load was not received in time. The terminal growth was six inches long. They did not do as well as the first car load. I think there is one item that the people ought to know: that evergreens in the nursery are planted close together.

Mr. Kelly: I must confess that I never saw a dozen balsam firs twenty feet high.

Dr. Spaulding: I think we ought to make a list of evergreens suitable for general cultivation. There are a few sorts that succeed well with ordinary cultivation. I have never seen the Hemlock spruce successfully cultivated in this part of the country. We succeed with the white pine, Scotch pine and Austrian pine, but fail with the Hemlock spruce; hence, we ought not to recommend it. Now, the arbor vitæ is even worse than the red cedar. These are very hardy and indigenous plants, but the objection is they brown very badly. I would not advise anybody to plant the arbor vitæ. We want evergreens that are green in the first of winter and maintain their greenness through the winter. There are three or four sorts. We would mention the Norway spruce, the Scotch pine and the white pine—very dissimilar in their appearance—which we can recommend. Now, we maintain that the landscape gardener can produce an excellent effect with these three varieties. They are all hardy, retain their color, and are very distinct in their characteristics. These three sorts afford a sufficient variety to ornament any place. I would mention the pine ponderosa as a tree which I would recommend for trial. It does not brown, but retains its color.

Mr. Huggins: I would agree with others in placing the Norway spruce, white pine and Scotch pine first; the Austrian pine next. I will give you my experience in regard to the Austrian pine, having had some considerable experience. My experience is quite different from that of my friend Mr. Colman. I have found a little difficulty in transplanting the Austrian pine, and it holds its color better than, or equal to the first three mentioned. I will mention my locality. I live forty miles north of this, in Illinois. The Hemlock spruce does the poorest of any. I think this Society would do an injury if they would recommend it with the others. My own opinion is that we are too far south to grow them. They do not do well with me.

Dr. Spaulding: I move that the Norway spruce be recommended for general cultivation. Carried.

Mr. Colman: I move that the Scotch pine be recommended for general cultivation. Carried.

Mr. ——: I move to recommend the American arbor vitæ.

Mr. Spaulding: I would oppose that, for the reason given that it turns brown.

Mr. Jordan: I second the motion for recommending the arbor vitæ. The American arbor vitæ turns brown but very little. The sun's rays falling upon the evergreen, when frozen, injure it. It cannot stand the winter's heat.

Mr. Clagett: I will mention one thing. I notice that the ladies prune the arbor vitæ too much for boquets. I think they would like to have it, and, therefore, it ought to be on the list.

Rev. Dr. Peabody: It seems to me, that in recommending trees for general cultivation, we should recommend such as have proved worthy.

Mr. Colman: I would dislike very much to see the American arbor vitæ slaughtered here. I would recommend it, because of its beautiful form. It can be grown in any shape; it is hardy. I have had them from two inches high to ten feet, sustaining no injury. I would recommend it, because it is the cheapest evergreen. It can be purchased at one-half or one-third the price of others. It is one of the finest evergreens for hedging purposes, and can be pruned into any shape or form. We all have places where we need a hedge. Another reason is, it is a rapid grower. The only fault is that toward spring they put on their golden appearance a little. [Laughter.] Well, is it not a golden appearance? If you call that brown, you do not know what brown is. And then just as soon as the sap begins to flow in the spring this color changes.

The motion to recommend the arbor vitæ was carried.

Dr. Edwards: I move that we recommend the Siberian arbor vitæ. Carried.

Mr. Jordan: I move to recommend the red cedar.

Dr. Spaulding: I have still greater objection to the cedar than to the arbor vitæ. It browns badly. I think we have a list sufficient. So far as the gold is concerned, the gold all flows into the pocket. [Laughter.]

Motion to recommend was lost.

Mr. Jordan: I move to recommend the juniper.

Mr. Spaulding: I think we had better have a description of it.

Mr. Jordan: It was brought from Long Island. It is pyramidal in its form; grows twenty-five to thirty feet high, though generally not more than ten feet. It retains its color very well. There may be some objection that it is not hardy enough. My experience is that it is hardy, and, for an upright evergreen, I know of none that will compare with it.

Dr. Spaulding: I have never seen specimens more than ten or twelve feet high, and I have seen a good many of them, and have admired them. They do not brown as badly as some others. But I think our object is to recommend something that everybody wants. If we recommend others we should describe them so that the people may know just what they are. Carried.

Mr. Huggins: I would recommend the Austrian pine. We have adopted some that turn brown. We now want some that turn red. [Laughter]. Not recommended.

Adjourned to 7 o'oclck P. M.

EVENING SESSION.

The Society met at 7 o'clock, and took up the following as the list of peaches recommended by the committee for general cultivation in Missouri (beginning with the earliest and running through the season), viz:

Hale's Early, Troth's Early, large Early York, Crawford's Early, George IV, Oldmixon Free, Crawford's Late, Stump the World, Columbia, Smock Free and Heath Cling,

Hale's Early was first considered.

Mr. Guye considered this tree of a fine and vigorous growth, inclined to overbear, with slight tendency to rot. Considers Troth's Early a much finer peach. Hale's Early comes only two days ahead of Troth's Early.

Mr. Earl said wherever he had seen Hale's Early, in Southern Illinois, it gave perfect satisfaction. Was all of ten days earlier than Troth's in the same orchards, and indispensable.

The question of recommending Hale's Early was agreed to.

Troth's Early was taken up.

Mr. Colman said it was important that this list, as recommended by the American Pomological Society for this State, should be carefully revised and considered.

Mr. B. Smith suggested that Haine's Early be inserted as a peach ripening about the same season as the Early York. It is, perhaps, a little finer peach. It was a cling.

The President said Haines' Early was not described as a cling.

Dr. Dyer: Some of the peach growers in this vicinity know Troth's Early under the name of Haines' Early.

Mr. Colman: This peach is so well known by peach culturists that it is not necessary to say anything in regard to it.

The question of recommending it was agreed to.

The President remarked that he would like to have members vote.

Dr. Dyer said he was not disposed to vote unless he knew what he was voting for. He condemned the practice of any one voting for a variety of fruit which he would not know when he saw it.

The large Early York was taken up.

Mr. Colman: I have had it in cultivation eight or ten years past, and found it a good and regular bearer. Peach showy and fine for table and market. Indispensable.

Mr. B. Smith: I think it one of the best of our early peaches. Fine in every respect.

It was recommended.

Crawford's Early was taken up.

Mr. Smith moved to strike it out, on the ground that there is a better class for the season. It is a large peach, but a large portion of the

tree does not ripen. It is very sour. Haines' Early was a finer peach.

Mr. Redfield considered it unworthy of cultivation. It sold well on account of its looks, but he did not think it profitable.

Mr. Earle: In Egypt, Crawford's Early is giving increased dissatisfaction. If saved from rot, and it ripens on all sides equally, it splits the stone.

Mr. Huggins: As compared with the Early York, it is far behind it as far as profit is concerned. I do not think it should be recommended for prairie culture, but is suitable for high grounds like the Alton bluffs. It is very tender.

Dr. Dyer: In the cold winter of 1862, all of my peach trees of this variety were killed, while others lived.

Mr. Colman: There are a good many objections to it, but we have no other variety that comes in at that particular time.

Mr. Muir: I have cultivated Crawford's Early, and I am exactly in the position that Mr. Colman is. It is rather coarse grained, but I know of nothing, out of a great many varieties, that supplies the place of Crawford's Early. If we strike it out, I think we are bound to supply something in its place. The idea of comparing the large Early York with it, seems to me to be wrong. They cannot be compared together in our section. So far as Haines' Early is concerned, I think it is a discrimination without a difference between that and large Early York.

Mr. B. Smith: If I understand the gentleman, he says Haines' Early and large Early York are about the same. Large Early York is not entirely a round peach. It is somewhat oblong and absolutely free from the stone. Haines' Early is as round a bullet. It is a larger peach than large Early York, and sticks to the stone considerably. It is a better flavored peach than large Early York, and is three or four days later. It nearly corresponds with Crawford's Early. Altogether it is fully as fine a bearer as large Early York, and will average a great deal larger. I got my trees of Mr. Colman, and I have reason to think they are correct. All others have been, and I have taken a great deal of pains in watching them. I feel confident that there is a wide difference between Haines' Early and large Early York; and as I have said, I think the latter more than fills the place of Crawford's Early.

Mr. Redfield: The gentleman has described as Haines' Early what is grown where I have been as large Early York. I am also satisfied that large Early York comes in two days sooner than Crawford's. If this difference exists in different localities, we better make a minute of it.

Mr. Spaulding: Crawford's Early is a peach I never admired, except in appearance. I became well acquainted with it in the State of New York many years ago. I saw a great deal of it there on account of its fine appearance and excellent market qualities. Some objections urged against it here did not exist there to my knowledge. As regards

taste it is not a peach I like. My taste is not for acid fruit; I like sweet fruits of almost every variety, but there is another class of persons who do not like fruits of that character. I have known men whom I regarded as excellent judges of fruit prefer Crawford's Early to all others; they admired it on account of what they called its rich vinous flavor. That is not my taste, but it is of some, and of course we cannot decide on the matter of taste. Haines' Early, which the gentleman describes, is a different peach from what I have seen as Haines' Early. I never grew it, but I have seen it in the principal orchards; and from what I have seen, it is a smaller peach than the Early York. In size and appearance it is about midway between the Early York and Troth's Early. It does not ripen as early as Troth's Early, but ripens, I should think, about the same time with Tillotson. The fruit is quite distinct from the Early York, and is not at all a cling. It is quite round and highly colored. I recollect Mr. ——— claimed to know Haines' Early as well as any peach, and when he went to select a Haines' Early last summer in Dr. Hull's orchard, he bought an early Tillotson, and pronounced it a Haines' Early. It was an early Tillotson, beyond question. I mention it to show the similarity between the two fruits, and not in derogation of his opinion. He selected it from a basket that contained several sorts of fruit; that shows the resemblance between the two fruits.

Mr. Muir: I will remark that I can substantiate what Mr. Spaulding mentions. It seems to me that in regard to Haines' Early and Early York there is a distinction without a difference. It is more in the culture of the fruit and the soil than anything else. Haines' Early is so much earlier, and so is the Early York, than the Early Crawford, that there is no competition with the two at all.

Mr. Colman: As my name has got mixed up a little with Haines' Early, I wish to say a word or two. I sold the trees to Mr. Smith as Haines' Early, and I believe I sold them for what they were. When I commenced the nursery business, I was very careful to get everything true to name; I used the greatest caution, because I did not want to send out anything by a wrong name. I got my buds from one of the most careful nurserymen at Cincinnati, for what was known there as Haines' Early, and I also procured the Early Tillotson and large Early York. They all proved to be distinct, though a great many contended that Haines' Early and large Early York were synonymous. I had large Early York and Early Tillotson in bearing, and I don't think I planted any of the Haines' Early out for bearing purposes. I quit propagating Haines' Early to any large extent, because I believe them to be synonymous. But two or three told me (as Mr. Smith has), who have trees of my propagation, that Haines' Early proved superior to the large Early York. From what they have told me, I shall cultivate it again.

Mr. Allen: As far as my experience goes, the distinction between the large Early York and Haines' Early is without a difference. I

procured trees of both varieties, and planted them at the same time and in the same orchard, and I can see no difference in the fruit.

Mr. Earle: I fear that Haines' Early is in much confusion. At our meeting at Bloomington the other day, Dr. Hull, who is perhaps our best authority, considered Haines' Early and Troth's Early as the same peach, and it so stands in our report.

Mr. Spaulding: At Alton, last summer, Dr. Hull asked me if I was acquaintained with Troth's Early. I told him I was. He said to me, "look in my orchard and see if you can find it." I looked, and came across some trees and said they looked most like it, but I did not think they were. Says he, "that's Troth's Early." I do not think it is, though they are so near alike that they will pass for each other, but they are both unlike the large Early York.

Mr. Riehl: I want to say that Haines' Early, large Early York and Crawford's Early are certainly not mixed up. Haines' Early and large Early York are certainly a different peach, and I cannot see how they should be confused. Haines' Early is a small peach, free from stone, and is ripe and ready for market by the time large Early York begins to ripen. It is also a different peach from the Tillotson, for it does not rot. The Tillotson rots badly. I cannot see how we can dispense with the Early Crawford, for I certainly know no peach that will take its place if we strike it out.

Mr. Huggins: The ground of my objection to Early Crawford is in regard to prairie culture. On the Alton Bluffs I am aware it succeeds well. If we could recommend it for high grounds and not for prairie culture, I think it would be a good thing.

The question being on the motion to strike out the Early Crawford, the vote was taken, and the motion lost. It was then recommended for general cultivation.

The next in order was George IV. That was agreed to without debate.

Next in order was Crawford's Late.

Mr. Muir: I wish to call attention to Catherine Cling. It is the most productive and money making peach of the season, and comes in just between Oldmixon Free and Crawford's Late.

The vote was taken, and Crawford's Late was recommended.

Stump the World is next in order.

Mr. Colman: I consider it one of the best market peaches in this vicinity.

Mr. Muir: It is one of the finest flavored peaches in the country.

The vote was taken, and the Stump the World was recommended.

The next in order is Columbia.

Mr. Allen: I would like to ask if Columbia is synonymous with Mammoth Cling or Missouri Mammoth?

Mr. Colman: I will answer. Mr. Allen will recollect that at one of the exhibitions of the Meramec Horticultural Society, Mr. North, of Labadie, I believe, exhibited some very remarkable peaches, the

largest I had ever seen. I inquired into their history. Mr. North told me he had brought the seed from Virginia, and planted them at his place in Labadie. I got him to send me some buds of this variety. I budded them and got a good many trees from them. I did not ask him, as I recollect, the name, but on account of its mammoth size, and being in Missouri, I named it Missouri Mammoth in my catalogue, at which he took very great offense, and blowed me up wonderfully through other parties, though he never said anything to me. He called it the Virginia. I gave it a new name, never having heard his name at all. I am inclined to think it is nothing more than the Columbia, after all, though I have no doubt he got the seed from Virginia, and supposed it to be a new and distinct variety. I have ceased to propagate it, and know nothing further about it, though all who saw it at the time regarded it as worthy of cultivation.

Mr. Allen: I am sorry to hear the gentleman has ceased to propagate this peach. It is certainly one of the best for market purposes.

Mr. Spaulding: Do you consider it distinct from the Columbia?

Mr. Allen: I speak of it because I got it of him as the Missouri Mammoth. I recollect the history of the peach of which he speaks. I think it a valuable peach. I had fruit from them six years. The first time the fruit proved to be very similar to peaches exhibited at the Meramec Horticultural Fair. They were very large, and ripened after all other peaches were gone. I still retain the name Missouri Mammoth, though I have peaches similar to them, called Columbia, but not so large. They are finely flavored, and ripened about the same time. I think they are distinct from what is generally called Columbia peach.

Mr. Muir: I received the buds of that peach from Mr. North. The foliage and the bark are very distinct. It is a magnificent peach. I think it is a seedling of the Columbia. The bark is most intensely red. The leaves are exceedingly large and brown. It makes the best foliage I know of. For a market peach I rank it very high. I do not think Mr. Colman was wrong in naming it the Missouri Mammoth.

Mr. Colman: I was fearful that it was the same as the Columbia, and that if I propagated it and sent it out, and it proved to be the same, that it would injure my reputation, just as I was in regard to Haines' Early being the large Early York.

Mr. Muir: It is evidently a seedling of the Columbia, but as distinct as anything can be. It has the largest leaves of any peach I ever saw.

Mr. Spaulding: There is one point in relation to the Columbia that ought to command attention. Although it does not reproduce itself, still it reproduces itself approximately. Therefore, I think it a tree that ought to be generally cultivated.

The vote was taken, and it was recommended.

Smock Free was next considered, and agreed to without debate.

Heath Cling was next taken up, and agreed to without debate.

Mr. Muir: I move to add the President.

Mr. Colman: This list was made out with the full knowledge that there were many other excellent varieties. We have tried to select varieties to fill the seasons from the earliest to the very latest, and, unless we should supersede some other variety, I do not think we should extend the list. Our list is already too large. The peach list and apple list are far too large. What we want is a few of the best standard sorts that will just fill the bill.

Mr. Muir: I have no objection to the peaches on the list, as got up, but I do think the President is a better peach than is named on that list, and I would move to substitute it in place of George IV.

The President: It is not in order now. It would have been when we had George IV under consideration.

Mr. Colman: It does not ripen at the time of George IV, by considerable. It is too soft for shipping.

Mr. Colman here said: I have the pleasure of presenting the credentials of three gentlemen from the North Missouri Horticultural Society, at Hannibal—S. F. Taft, Jasper Turner and O. H. P. Lear, all fruit growers of Hannibal.

Mr. Spaulding: It seems to me our list of peaches is a little defective in one respect. We ought to have a later ripening freestone peach. I believe there are such. I know from the description in the State Pomological Society of Ohio, that they have varieties of freestone peaches there that ripen with the Heath Cling. Whether we have them here or not I am not certain. We have certain late varieties—Late Admirable and Ward's Late Free. I believe they are later than the Heath Cling. Carpenter's White, if I recollect aright, and another variety ripen after Smock Free.

Mr. Muir: Carpenter's White comes in, I think, immediately after Heath Cling. At the Meramec Horticultural Society it was stated that it had given abundant satisfaction in New York, but that they had no trees for sale.

Mr. Spaulding: Quite as late, I think.

The President: If it be any satisfaction to members to know where to get buds of Carpenter's White, in this county, I can supply them.

Mr. Spaulding: I don't know the fruit, having never seen it, and I don't want to say much about it, but I see it is commended as one of the most reliable sort of peaches, and if I recollect aright, it ripens quite as late as Heath Cling. Ward's Late Free is a peach I have seen grown in a number of localities. It is a superior peach, and one I would like to see in the lists. I will move to add it to the list.

The motion was agreed to.

Society adjourned.

MORNING OF THE SECOND DAY.

The President in the chair.

Prayer by Rev. Mr. Coe.

Mr. Muir, Chairman, read the report of Committee on Cherries. Report was received.

Mr. Guye, Chairman, read the report of the Committee on Small Fruits. Report was received.

Dr. Clagett: I move that we consider the report on small fruits. Carried.

The President: The blackberries are first on the list.

The only blackberry recommended was the Lawton blackberry.

The President: The raspberry is next in order. What raspberries will you recommend?

Mr. ———: I move that we recommend the Doolittle Black Cap.

Mr. Husmann: From what I have seen of the Doolittle raspberry, I cannot recommend it. It is inferior in flavor, and, I think, we have many raspberries much better than this one. I cannot recommend it.

Mr. Colman: I am perfectly astonished to hear my friend Husmann speak in this manner about this berry. I do not think any one will substantiate anything that he has said. I think he must be mistaken in the variety that he cultivates under the name of Doolittle. I never knew a variety so productive as this, none so profitable. I have had them in cultivation a number of years. I have found that they are earlier by a week or ten days than the Cincinnati varieties so largely cultivated there, and earlier than our own varieties of Black Cap that I have had from the woods and everywhere else. I have found them to be much larger, less seedy and less pulp and far more productive. The raspberries from the woods are of all kinds—some are very good, others are worthless. This variety was originated, or at least brought into notice, by Mr. Doolittle, Oak's Corners, New York. Everywhere it has given the greatest satisfaction. Mr. Mason makes over a thousand dollars an acre with these berries. I have thought so highly of them myself that I have planted out a number of acres. We have no varieties that can begin to compare with them. Now I wish to say I have no doubt that Mr. Husmann is perfectly honest in his remarks; but there is certainly something in his soil or manner of cultivation or location, or else he is mistaken in the variety that he cultivates.

Mr. Husmann: All I can say in regard to the varieties is that I got them of Mr. Colman himself. [Laughter.] I must say I am myself somewhat astonished. I tried to get the best varieties. As to being the earliest and most productive, and all that, it may be so, but I have not discovered it. As to my soil, I can say raspberries grow wild in every fence corner. I cannot think the difficulty is there.

Mr. Huggins: One word. We all know that Mr. Colman lives near

market. I would like to know how it will bear carriage to a distant market. That will interest many of us.

Mr. Earle: It is grown largely in Egypt, and bears an excellent character. We could not afford to be without it.

It was recommended.

The President: The next on the list is the Miami.

Mr. Colman: I have had it in cultivation, but do not think it equals the Doolittle; consequently, I would not recommend it. I do not think we should recommend varieties unless they are superior to other kinds. I do not think it much superior to the common black varieties.

It was not recommended.

The President: The Ohio Everbearing is next on the list. What will you do with it?

Dr. Clagett: I do not think it is a berry that we can recommend for general cultivation, because it requires particular management, and is uncertain. We should not recommend any here except those upon which we can rely—those which are easily cultivated, hardy and productive.

Mr. Muir: I have sixteen varieties, and will throw away fourteen of them to retain the Ohio Everbearing as one of the two I would wish to keep.

Dr. Clagett: My experience with the Everbearing varieties is that they give very poor satisfaction. From what I have seen I cannot recommend them for general cultivation.

It was not recommended.

The Purple Cane was next proposed.

Dr. Clagett: The Purple Cane is a very hardy variety. It requires no extra care or protection. It is an excellent bearer. It does not bear carriage a long distance. But those living near market will always find ready sale and good prices. I think any one raising the Purple Cane will be pleased with it.

Mr. Rheil: I move that we recommend it for family use. We cannot recommend for long carriage. They can be recommended at least only for close market. Hence, I think it will be safe for us to recommend only for family use. Those who live near market can take that into consideration.

It was recommended for family use.

Mr. Colman: I have had ten years experience with the Purple Cane. I would not recommend it for general cultivation, nor even for family use. It is hardy, and, some years, bears well, and, some years, does not bear well. It is also a very rampant grower, so much so that it is a great deal of trouble to keep it in bounds. It grows readily and profusely all over the ground, and is not such as I would recommend. I find better varieties than the Purple Cane, and, consequently, shall not favor it.

Mr. ——: I think it is the best variety that we have.

Dr. Clagett: Those who have had experience with this berry like it above all others. They say it has better flavor and keeps well.

Mr. Baylis: It goes to market in good order, and is in favor with us.

Mr. Colman: I am sorry to say that my experience does not accord with that of other gentlemen. I live at a less distance from market than many others, and I may bring them in on springs, and they will not keep. It will not answer to take this berry to market unless sold immediately. They will not keep. In this respect it is quite inferior to the St. Louis raspberry.

Mr. Baylis: I have brought the Purple Cane to market, and it is regarded as a superior berry. Customers will wait for it. They say it is better than any other.

It was recommended for family use.

Mr. President: The Philadelphia is next on the list.

Mr. Sanders: I want to hear gentlemen state their experience with this berry.

Mr. Guye: I will state that I have found it to be a good berry. It is large, very productive and hardy. We think favorably of the Philadelphia. We would at least recommend it for trial. It promises well.

Mr. Baylis: It is a variety that throws out few suckers. It is, therefore, easy to cultivate, much easier than many other varieties.

Mr. Colman: Mr. President, I have the Philadelphia in cultivation, and am very well pleased with it. I think that it may prove one of our best varieties. But it does not possess any advantage over the St. Louis berry. One thing about the Philadelphia, it does not propagate at all. I wish it did sucker more. I want to get some plants for sale.

Mr. Baylis: The St. Louis does sucker very much, and this is my objection to it for market purposes.

The Philadelphia was not recommended.

Mr. Baylis: I move that it be put upon the list as promising well for general cultivation. Carried.

Recommended as promising well.

The President: The next in order is the Brinkle's Orange, recommended for special localities.

The Brinkle's Orange was recommended.

Mr. Mertfeldt: I wish to recommend the Hudson River Antwerp.

Mr. Colman: I have tried to cultivate this berry, and have found that it is not adapted to this locality. It is too tender. I tried mulching, but without success. We want hardier varieties than this for our locality. We have got the worst climate in the world for these small fruits of tender varieties. The snow in more northern localities will protect these plants. They may do well there, and fail here. It is an excellent fruit, but is very tender. The frosts of October will sometimes kill them. I know that we had two years ago frosts in the earlier part of the season that killed them dead. Even if we trust to covering them, there are so many of us that neglect it at the proper

time, that we are almost sure to lose them. Now, if we can cultivate varieties equally as good, without being compelled to get these tender and nice sorts, I think we should do it.

Mr. Beale: My next door neighbor has given it a fair trial. It was one of his favorites. But I think it has entirely run out, with the best care.

Mr. Taft: My experience has been like that of Mr. Colman. I think it is not worthy of a further trial.

Not recommended.

Mr. Colman: I move that we add to the list the St. Louis. I have had this in cultivation for a number of years, and, with the exception of the improved Black Cap, it is the best of thirty varieties that I have had in cultivation. I cling to this because I find that it is hardy and productive. I do not know its name. I know its history. A man by the name of —— had one plant from which the plants were propagated. A neighbor of mine procured the plants from him, and I received it from my neghbor. I have found it very profitable for market. It may be that they are identical with some other varieties. I do not know that they are grown anywhere else. I have put it in my catalogue as the St. Louis. It is an excellent berry, and, I think, ought to be recommended.

Mr. Baylis: I would ask the gentleman a question. There is a berry called the Minkle. Is it not identical with the St. Louis?

Mr. Colman: I think it is not identical.

Mr. Baylis: I think it is the same berry as the St. Louis.

Mr. Colman: I will say that I visited Mr. Baylis' grounds, and found that his canes had been injured by the winter, while mine had sustained no harm. There is a striking similarity between the canes, but I do not think they are the same. With regard to the suckers, I would say, they induce suckers to grow by pulling up the roots. I do not believe in the system of cultivation sometimes adopted. In fact, I do not cultivate at all. I believe in preparing the ground in the spring and then mulching. Then, all you have to do is to go along with your hoe and cut out the suckers as you would the weeds. Most of the varieties throw up suckers. I wish I could get more suckers than I do. I do not consider that any objection.

Mr. Cozzens: I will say that I have the same variety of which Mr. Colman speaks, and would recommend it for general cultivation.

The St. Louis was recommended.

Mr. Sanders: I recommend that the Red Antwerp be placed upon the list.

Mr. Baylis: I will state that we have the identical St. Louis and the Red Antwerp of which Mr. Sanders speaks. We regard them as identical.

Dr. Clagett: I don't think we ought to recommend berries of the same name, or the same berry under two different names.

Motion to recommend the Red Antwerp was withdrawn.

Gooseberries. Haughton's Seedling was the only one recommended.

Currants. The President: The first on the list is the Cherry currant.

Mr. Jordan: I have nothing to say in its favor. I think we have others that are much better.

Dr. Beale: I think it is one of the finest berries that we have, but it is not productive, and, hence, I cannot recommend it for general cultivation. For productiveness, it cannot be compared with the Red Dutch.

Mr. Redfield: It is productive and very profitable for market at Bunker Hill.

Mr. ——: It gives satisfaction wherever it has been highly cultivated. It has given good satisfaction at Hannibal.

Mr. Colman: I do not think it is worth a cent. I have had it in cultivation a good many years, growing side by side with the large Red Dutch. The Cherry currant gets smaller and smaller. It does not bear and does not grow.

Mr. Baylis: My bushes are growing well. I have no fault to find in this respect. But they don't bear. This is my only objection. I have ceased to cultivate the currant. I plant and then mulch them.

Dr. Clagett: I have a few bushes, and don't want to extend them.

It was not recommended.

The Victoria was proposed.

Not recommended.

The White Grape was proposed.

Not recommended.

The Red Dutch was proposed.

It was unanimously recommended as worthy of general cultivation.

Mr. Jordan: I would recommend the White Dutch as a berry worthy of cultivation to those who want a white currant.

Mr. Colman: The White Dutch is an excellent variety. It ought to be cultivated by every one who wants a white variety. It is productive, and in every way in favor.

Mr. Baylis: I have what I suppose to be the White Dutch. It is not very productive. The only objection is that it is not productive like the Red Dutch.

Mr. Jordan: I recommend it, because we have no better white currant. There is no currant that will produce as abundantly as the Red Dutch.

Question: Does it bear well enough to cultivate?

Mr. Jordan: I think it does, though it is not as productive as the Red Dutch.

Mr. Colman: I can answer that question. I have been sending it to market in ten and fifteen bushel lots, and I find it as productive as the Red Dutch. A great many will have it, and I think we ought to recommand it.

Carried.

Mr. Muir then read the report of the Committee on Plums.

Mr. ———: I move that the report on plums be taken up. Carried.

The President: The Imperial Gage is the first on the list.

Mr. Smith: I have cultivated the Imperial Gage in Northern Illinois and in Southwest Missouri. It did well in both places, but better there than here. It is an excellent plum and bears well.

It was recommended for general cultivation.

The Lombard next proposed.

Mr. Smith: I have cultivated this plum in Northern Illinois with good success. I have not had it here in Missouri long enough to know how I shall succeed with it. I would favor putting it on the list from its general good character. I will say that the cultivation of the plum has been very discouraging, on account of the ravages of the curculio, so much so that few people will try to cultivate them. I have seven or eight varieties, and have not yet seen a curculio. I have cultivated them for five seasons.

Solomon Johnson: Have they been bearing five years?

No, sir.

Mr. Mertfeldt: I know a gentleman who has succeeded in cultivating seventeen varieties. He keeps off the curculio by jarring the tree. It appears that "eternal vigilance" is the price not only of liberty, but also the price of fruit.

Mr. Colman: I fear that if we require six votes to elect any variety upon the list, and if only those vote who have had experience and success in raising plums, we shall fail to elect any of the varieties. I do not believe there are six members of the Society who have tested these varieties, and can, from their own experience, recommend their cultivation. I have knocked about the country a great deal, and I do not find any plums. The only successful plum orchard of which I know, is Dr. Hull's, of Alton. He has a large variety and has success in raising them. I have tried to raise them and have failed most beautifully, and my friends have failed as beautiful as I have. Why, then, should we vote to recommend plums which we have failed to raise?

Mr. Baylis: I have seen very few perfect plums. I have seen them at Mr. McPherson's—with this exception, I have seen very few perfect plums.

Not recommended.

Mr. Colman: I move that we defer the further discussion of this subject for the present. Carried.

The President: The report on strawberries is now in order.

The Secretary read the report.

Dr. Clagett: I move that we take up the report on strawberries. Carried.

The Iowa was proposed. It was recommended without discussion.

Dr. Spaulding: I wish to give an explanation of my vote, if not too late. I voted for the Iowa because we have no other that will fill its place. It fills up a gap in the strawberry crop. For this reason I recommend it.

McAvoy's Superior proposed.

Mr. Clagett: I have been growing the McAvoy Superior for some years, and regard it for quality as one of our very best. It is a very good bearer. It is not quite as hardy as some others, but in every way a berry worthy of cultivation.

Mr. Quinette: I have cultivated it for about four years. The Wilson's Albany will bear more, but this is good and worthy of cultivation. I will recommend it.

Mr. Taft: It is a good berry, but will not stand carriage.

Mr. Earle: I am opposed to recommending that or any other pistillate variety for general cultivation. We have plants that are self-fertilizers and equally good. These should be recommended rather than any pistillate plants.

Not recommended.

Wilson's Albany proposed.

Recommended by a unanimous vote, without debate.

Moyamensing proposed.

Mr. Baylis: It is very hardy and productive and worthy of trial.

It was not recommended.

The Russell was proposed.

Mr. Kelley: We are disposed to consider the Russell identical with the McAvoy's Superior. If we discard the McAvoy Superior, I do not think we ought to recommend the Russell.

Mr. Baylis: I have the Russell and McAvoy's Superior growing, and can say that they are distinct. They are not the same berry. They are as distinct as the Iowa and the Russell.

Dr. Edwards: I have cultivated the Russell for the past two years. I am satisfied that it is equal to the Albany seedling. It is a first rate berry. It grows very well. They are rather softer than the Albany seedling, but to my taste they are better—the flavor is better. They are larger and quite as productive. They propagate very easily and rapidly. In the East, it was said that the Russell and Buffalo were identical; but I have both. I think we can in this region plant no varieties better than the Russell.

Mr. Quinette: There seems to be an idea that productiveness is the only quality to be recommended. We want some good flavored berry. I would put the McAvoy Superior on the table. I can see no difference between the Buffalo and the McAvoy Superior, but I see a great difference between the Russell and McAvoy Superior.

Dr. Morse: I have had Russells in bearing two years, and I have not discovered that they are any better in quality than the Wilson. It has not been with me so abundant and productive. There is the same objection to this that there is to the McAvoy Superior. It is a pistillate plant. If you discard the McAvoy, you must discard this for the same reason.

Mr. Colman: I must say that, from my experience, I am not entirely

satisfied with it. At best, I could only recommend it as promising well.

Not recommended.

A lengthy discussion followed upon the Green Prolific, Agriculturist and Jucunda, or Knox's Number 700, but none of them are recommended, as it was considered that none of the members had sufficient experience with them.

The President announced that Mr. Haven, the superintendent of the St. Louis Park of Fruits, was present with baskets of fruit, and the members and visitors from other States were invited to partake of them.

The meeting then adjourned.

AFTERNOON SESSION.

JANUARY 10th, 2 o'clock, P. M.

President in the chair.

The President: One of your by-laws reads as follows:

"In future the annual election of officers in this Society shall be at the opening of the afternoon session of the second day."

That will be the first business this afternoon.

Dr. Beal and Mr. Carew Sanders were appointed tellers.

Mr. Colman: Never in the history of this Society has it been more important to select a presiding officer than upon this occasion. Not only the future success of this Society is to be promoted, but the great horticultural interests of this State are to be kept in view. We are to bear in mind that an era, perhaps in the history of this State, certainly in its horticultural history, will dawn upon us next September. As has before been stated, the American Pomological Society will hold its meeting in the city of St. Louis—and when we say that, it is saying a great deal. The representative men of horticulture throughout the United States, and from every State in the Union, as I hope, will be here. They want to see what we can do here, and we want to show them what we can do. Very much of the success of that exhibition will depend upon the presiding officer of the Missouri State Horticultural Society. We have to make the most ample arrangements in procuring halls or rooms, in the court house or somewhere else, in order to have that exhibition a successful one, and also to provide quarters for the numerous guests who will be here. We want some man as the presiding officer of this Society who is acquainted not only with the horticulturists of Missouri, but with those of Illinois—who is nearly as much an Illinois man as a Missouri man, for Illinois men feel as deep an interest as we do in the success of this exhibition—a man who will be sure to give it his attention; not only his attention but his whole soul—whose heart is in it, and who will lend a helping hand to make

such an exhibition that the people from other States will go back and tell what sights they have seen here, such as they never saw before at any exhibition. Such an exhibition as I hope to see will draw to our State an immense immigration, for its capacities for growing fruit are not yet known.

In consideration of all this, we should forget friends and party interests—we should select the man who will do us most good as the presiding officer of this Society as its true representative on this occasion. We must let everything else sink, and study who should be the best man. It is in consideration of the importance of this step, sir, that I have got up to nominate one of our members—a man prompt in the chair, quick in putting a question, a good parliamentarian, who has had ample experience as a presiding officer, and who, better than all that, is one of the best outside workers that I know of, who will accomplish more in getting up a successful exhibition here than any one of us can possible do. I nominate (although he has declined, yet I know him well enough to know he will serve if it is the wish of the Society,) Henry T. Mudd as the President of this Society for 1866.

Dr. Spaulding: I agree fully with all the remarks which have been just expressed so eloquently. I think the occasion the most important one which has ever happened in the history of horticulture in this State, and I agree with him fully on the importance of the election and the care that should be taken. I arise for the purpose of making another nomination, not on account of any objection which I have to the gentleman already nominated, but I feel there is a certain amount of honor due to one of our number for the labor he has done for the cause of horticulture among us. I nominate George Husmann, of Hermann.

Mr. George Husmann: While I fully appreciate the honor done me, I most respectfully, but firmly, decline serving. From my inability, I would, perhaps, make a very poor President, and for the very reasons that have been named, I would be unable to serve, for if we are to have the Pomological Society meet here, and make up an exhibition at that time, I mean to be one of those who put their best foot foremost to exhibit, and I shall have but very little time to spare for arrangements. I consider that I can do more good that way than if elected to the very high and responsible office of your President, which I should very poorly fill. I most heartily second Mr. Colman's nomination.

The Society proceeded to ballot, with the following result:

Dr. Morse, 1; Dr. Edwards, 1; Mr. Elliott, 7; Mr. Sanders, 1; Henry T. Mudd, 55.

Mr. Mudd: It has prevailed rather as a custom in this Society to reelect your President for a second time. When you reëlected me for the third time, a year ago, I believe I did say, at that time, that I would want to be reëlected again. It was in view of this great meeting here

next fall. But I find growing on me an aversion to hard work. I have found this not only a place of honor, but I have found that there is a great deal of work to be done, and I anticipate more than ever before during the coming year, and before this meeting commenced, I had concluded that I did not want the position. I had hoped that your choice would have fallen on some one else; not that I am unmindful of the honor you have conferred upon me. I appreciate it fully, but the considerations already mentioned, and some circumstances that have occurred during the last year, made me feel that it was improper that I should occupy the position again, and I said so in my address at the opening of the meeting; but the vote you have just given me is one I cannot be indifferent to, and I will undertake to discharge the duties of the office to the best of my ability during the ensuing year, and shall claim your coöperation and assistance, and hope, in this, I shall not be disappointed.

The next thing in order is the election of five Vice Presidents.

Mr. Colman: It is quite important in the selection of our Vice Presidents to have the various parts of our State represented at this particular time, and for the next year. There are five districts—the Central, the Northeastern, Northwestern, Southeastern and Southwestern.

Dr. Spaulding: And also the State of Illinois.

Mr. Colman: Yes, but this year they will take care of their own affairs in that way. We have here a member from the Northeastern District, ripe in years and fruit growing experience. His name is O. H. P. Lear, of Hannibal, Missouri. I would be very glad to see him elected from that part of the State. He is a member of the Northeast Missouri Horticultural Society. I put him in nomination.

Barnabas Smith, of Crawford county, was nominated as Vice President from the Southwestern District.

George Husmann, of Hermann, was nominated.

Thomas Allen nominated Dr. B. F. Edwards, of St. Louis, as one of the Vice Presidents.

The following nominations were made:

Cyrus Russell, of Iron county; Dr. W. S. Dyer, of Jefferson county; Thomas Walker, of Jefferson county.

The ballot was taken, and resulted as follows:

O. H. P. Lear received fifty-two votes; Dr. B. F. Edwards received forty-four votes; George Husmann received forty-four votes; Barnabas Smith received forty-four votes; Dr. Dyer received thirty-three votes, and the above named were announced to be the Vice Presidents of the Society for the ensuing year.

President: Next in order is the election of a Treasurer for the ensuing year.

Mr. John H. Tice was nominated.

After the ballot the President announced that the Society had given

a unanimous vote for Mr. Tice, and elected him as Treasurer for the ensuing year.

Mr. William Muir was nominated Recording Secretary, and elected by thirty-one votes out of thirty-two votes cast.

Dr. Edwards then nominated C. M. Saxton as Corresponding Secretary, and Mr. Colman nominated R. S. Elliott for the same position.

A vote was taken, and Mr. Elliott having received twenty-six votes, and Mr. Saxton thirty-one, Mr. Saxton was declared to be the Corresponding Secretary for the ensuing year.

The President then announced the following committees:

Committee on Fruits—C. W. Spaulding, Charles Corwin, S. M. Baylis, Jonathan Huggins, George Husmann, O. Quinette, Dr. E. S. Hull.

Committee on Wines—L. D. Morse, Louis Wolf, W. S. Dyer, Dr. Schroder, N. J. Colman, C. W. Mertfeldt, Dr. Clagett, Parker Earle, C. H. Haven, Dr. R. Bircher, J. M. Pearson, R. S. Elliott, J. G. Soulard, T. F. Taft.

Dr. Clagett read the following essay upon the subject of the circulation of the sap and the importance of observing the periodicity of its conditions in the practical operations of horticulture.

Mr. President and Gentlemen of the Society:

Believing that there is a time and a season for every operation in horticulture, and as our discussions here, from year to year, exhibit a diversity of opinion which shows that we have not attained that definite knowledge which we need to direct our operations understandingly, we are admonished that the time has come when special efforts should be made to settle these mooted questions, and to establish the art of horticulture on a scientific basis, that we may not continue to be perplexed with conflicting opinions, but guided by well ascertained knowledge. As a knowledge of the circulation of the sap and the periodicity of its conditions is the foundation on which the whole superstructure can firmly rest, I propose, on the present occasion, to bring that subject before you, that the observing and reflecting faculties of this enlightened body may be directed to the, as yet, little understood laws of vegetable life.

As horticulturists, it is our duty and interest to search out that we may understand all that may be known of these laws. The investigation of the subject, if conducted in a proper spirit, cannot fail to do us good, if it only leads us to adore more intelligently the great first cause of all being, who has given us "every herb bearing seed which is upon the face of all the earth, and every tree in the which is the fruit of a tree yielding seed;" and it is by Him that we ourselves, also, live and move and have our being.

The understanding of what may be known of the laws which govern vegetable life, may also lead to other profitable results; for the knowledge may lead us to understand the cause of blights and other

diseases to which plants in this climate are liable, and some years prevents them from perfecting their fruit, to our great loss, as well as our frequent failures in grafting, budding, etc. If we understood the cause of failures, we would be in a better condition to seek for the remedies, if happily there are any for us. The subject is, therefore, a very practical and important one. I only wish I were better qualified to bring it before the Society; but to do justice to the subject would require more time, and an extent of knowledge that I have not at my command. All I can, therefore, now hope to accomplish in bringing the subject before you, is to give the right direction to investigation, that we may get out of the atmosphere of speculation, and reach, as regards this matter, the knowledge of laws.

We cannot understand *life itself;* all that may be comprehended by us is the conditions or laws under which it is developed, and enabled to reproduce seed after its kind, and serve the other purposes for which the Creator gave it organisms; to each kind of seed its own organism, with the natural attractions and repulsions which constitute the essence of each species, and distinguishes each kind of plant from all others. The life of vegetables is in the sap, just as the life of animals is in the blood; and each species of plant, just as each kind of animal, has a constitution peculiar to itself, upon which its properties depend. Each vegetable form of life has, therefore, its own peculiar tastes, and habits and qualities; these constitute its nature, and by them it may be known from all others. In order to understand the laws under which life is possible from the seed of any plant, we must know that it is not only necessary that the parent plant begets its own likeness in the seed, so that the embryo of the parent, in all its organisms, is there in the germ perfect; but the parent must surround its progeny with food containing all the constituent elements of its own nature, in a thoroughly prepared state, and just ready for assimilation, so that as soon as the embryo is quickened it may find for all its organisms nourishment.

This perfectly prepared food for the offspring is called the *elaborated sap;* it is the same in all its constituents with the embryo germ, and is ready to enter into the structure of its organisms as soon as life shall seek for nutriment, by a law which must be *the law* by which the sap in plants do circulate.

Many theories have been put forth by the learned and speculative to explain this matter, but they are all, to me, unsatisfactory; they are too complicated to be true, and, with all their complications, they are all inadequate to explain *all the phenomena* of vegetable development. Dr. Draper says, "the juice which is about to nourish a part has for the part a certain affinity, but with the accomplishment of the nutrition the affinity is at once lost." The words "certain affinity" explain nothing, and are equal to saying it is so because it is so. Others tell us that "capillary attraction" constitutes the law, but they do not tell what capillary attraction is or what produces it;

others again tell us, that moisture and heat change the nitrogenous elements of which the seed is composed and causes the atoms to separate or combine, to move one from another, or one towards the other, and to effect new combinations. This, too, is just saying it is so because it is so; there is no law given, nor any explanation of the matter. That water and heat do change the volume of the stored up elements of nourishment, and that chemical action does produce important changes in them is certain, and that, under the stimulus of heat, the germination of the embryo plant takes place, is also a well known fact; but it is no less certain, although not so generally known, that, from the moment life begins, the plant becomes subject to laws higher than either of these, to which these, from that moment, work in subordination. Much ingenuity has been displayed in attempts to show how the sap may ascend by capillary attraction, but, unable to explain it descent upon that hypothesis, some have denied its descent altogether.

In the Patent Office Reports for 1859, page 362, we have an article on the "Art of governing the sap," by M. P. Joigneaux, editor in chief of the "*Feuille du Cultivateur*," Paris. (Translated by C. A. Alexander, of Washington, from the "*Journal Mensal de l'Academie Nationale, Manufacturiere et Commerciale*," Paris.) This writer says: "A cultivator who gives himself no concern about the circulation of the sap in vegetables is not more in his place in the midst of his fields, than an engineer of a locomotive would be in his who knew nothing of the properties of steam. The rejoinder, it is true, may be made that ignorance of physiological laws is very pardonable in the cultivator, since men of science are by no means of accord with regard to the course of the sap. In effect, they arrange themselves into two different camps—one admitting the descent of the sap, the other denying it; but what imports to us the divergence of their hypothesis, if, as far as practice is concerned, they correspond to observe facts, and terminate in the same results.

"Now this is precisely what happens. Both equally satisfy us; and, if we have adopted the theory of the descent of the sap, it is because it is the most diffused, and for no other reason. We say, then, the roots take up the liquid manure, which becomes sap and ascends through the body of the plant chiefly through the alburnum, is retarded awhile in the upper part, becomes modified and thickened, and then descends from the top towards the roots, depositing in its passage a new layer of alburnum."

Here we have the statement of a gentleman occupying a position the most favorable for becoming acquainted with all that the men of science in Europe have reached on this subject, that they are by no means of accord with regard to the course of the sap, and, therefore, he allows that ignorance on the part of the cultivator is very pardonable. Can we say as much for the men of science (they should be called theoretic, for they are certainly not scientific on this subject),

or wonder that the practical cultivator should look upon their teachings with so much distrust, when they betray such a want of practical acquaintance with the subjects they attempt to treat? A very moderate amount of intelligent examination of the growth of plants ought to have settled the question of the descent of the sap beyond controversy, for the nature of the case should have led us to conclude the necessity of its descent, and facts in abundance demonstrate it to an absolute certainty. As this will fully appear in the progress of the investigation, we omit further comment on these quotations for the present. What we would urge upon the cultivators of the soil is, that each one investigate the subject for himself.

We should no longer look to men of other professions (however learned they may be in their own) to develop the science of ours, but should seek to establish the science of our own. No other class of men are so deeply interested in its study, and none so favorably situated for its investigation; for in our daily occupations we are surrounded with the very books in which this science is written, by an author of unquestionable authority. In every plant and tree we cultivate the Creator has written all the laws appertaining to it, and He continues to write them over and over, year after year, in the same way, for our instruction. If we remain in doubt the fault is our own. It is true that, in learning to read these books, we must commence as we did in learning to read other books; we must, at first, skip the fine print. At first, much may appear obscure and uninteresting, but if we commence in earnest we shall soon find ourselves making progress; that which was at first obscure will grow brighter, and we will soon find it a subject of absorbing interest, and as motion added to motion increases velocity, so will our progress be accelerated by every step we take in the right direction; and as the organized plant gathers and assimilates the food for its development, so may this organized society, if true to itself, gather and assimilate the material to establish the science of horticulture. This is the ripe fruit we should aim to bring forth. We shall then direct our labors understandingly and reap the full reward.

A careful examination of the growth of plants will show that the sap moves in all directions, and that its course is determined by conditions which the mere mechanical and chemical laws fail to account for, and that electricity performs an important office in the circulation of the sap and in carying on the growth of vegetation in all its forms. Next to mind, it is the most subtle, active and powerful element in the universe, and is the first physical element with which the mind comes in contact, and by it with the grosser forms of matter. Electricity is not life, nor can it give life, but it is life's nearest approximation, and is *the* agent by which life is brought into fellowship with matter; and we shall find the attractions arising from positive and negative electro-magnetic conditions form the law which has been called capillary

attraction, and which produce the "certain affinity" between the food and the plant, and the plant and the food of which Dr. Draper speaks.

We shall, also, find that each species of plant has its own *peculiar magnetic nature;* and although all magnetisms have much in common, yet each species of plant and animal has a magnetic nature peculiar to itself, which constitutes the essence of its being, and makes it differ in its properties from all others; and it may even be that each *organ* in man, in animals and in plants has a magnetic nature peculiar to itself, and that it only attracts to itself food that, by chemical agency and the all-pervading electricity in nature, has been brought into a state of agreement with its nature, and that can, therefore, supply its wants. The plant draws its support from two classes of elements. In tracing the circulation of the sap, we should consider the relation which these two bear to each other, and the relation which they bear to the plant. The first is found fixed in the earth, held by the absorptive power of the soil, and is not, as some suppose, floating in a liquid state. Water alone will not disengage them. They cannot move from their place, but the organs of the plant must go to them and detach them by an attraction superior to the absorptive power by which they are held. These food elements exist in the soil in two conditions; originally they are in a state of chemical combination with the soil, and can only be detached by plants of the most vigorous powers of attraction; but once disengaged and combined by the plant with the elements of the air, they return to the soil in an improved condition; not to enter into their primitive state, but to adhere to the outer surface of the earthy particles, to serve as food for plants of a more improved order. Many of the weeds of which we ignorantly complaim perform this important office of preparing food for plants that prepare food for animals that prepare food for man. This partially prepared food is also held by different soils with different degrees of tenacity; hence, some plants will flourish luxuriantly in a soil where others will fail to get a support—not because the food does not abound in the soil, but simply because the plant does not possess the power to disengage it from it.

We must, also, consider that the elements in the atmosphere are electrically positive and those in the earth negative, and, also, that things are positive and negative, comparatively—that which is positive to a lower may be negative to a higher condition; and as the plant occupies a position mediate between the two, and in communication with both, the course of its fluids will be determined by their condition—those in a negative move towards the positive, and those in a positive condition towards the negative pole.

In the seed we have the embryo plant or life germ in a dormant state. The mother plant has stored around it all the food necessary for its complete organization, immediately around the life-germ food, in a condition just ready to enter into its organism and to be assimilated into its life when quickened; and around this perfectly prepared

food she has stored food further removed from the sensativeness of life, which forms a protection both to the life germ and the food prepared for immediate use. This requires to be chemically changed to bring it into the proper state to fit it to supply the wants of the plant; that portion which is furtherest removed from the position of the embryo is also furtherest removed from it in condition, so that the food is brought into a proper state as the wants of the plant require it.

The size and vigor of the organized plant will be in proportion to the perfect development of the embryo germ and the maturity of the stored up food. This is strikingly illustrated in the difference in the size of young stalks of corn growing in the same hill, and it is equally true with all other plants. This difference will be found in the crop at harvest, which shows the importance of sowing none but perfectly developed and well matured seed. When the seed is placed in the ground with the proper degree of heat, moisture and air, water is absorbed, and, by the stimulus of heat, the life germ is quickened into activity; chemical action in the stored up food commences; the glutinous portion immediately around the germ first becomes liquidized, and fitted to be taken up by the embryo plant to carry forward the organization.

Here commences the operation of the organizing forces. The particles begin to move, one towards another or one from another, according to the attraction arising from positive and negative electromagnetic conditions, the positives repelling each other and the negatives doing the same, while the positives and negatives come together and unite, each particle having polarity, the positive point of one particle attaching to the negative point of the other, leaving its negative point for the attachment to the next particle. In this manner particle after particle moves on to its place, until the organization is complete.

This will be found to be the universal law of all true organization. By the same law the polen was carried from the stamen to the pistol in the flower, which commenced the organization of the embryo plant in the seed.

The embryo plant being positive to the negative food in the earth, the attraction resulting from this condition carries the first movement of the organization towards this unassimilated food, which is ordinarily downward, but which may be horizontal or even upward, according to the locality of the food for which it has an attraction, some plants drawing their food from the upper, and others from the sub-soil, but always in the direction of its appropriate food, getting over, under or around any obstruction in its course, if it can, and often forcing its way through difficult passages. It is this attraction which draws out the organizing cells in the form of capillary tubes. In the infantile state of the organization, the outer walls of the cells only are organized; within, they are filled with the moving sap from which the organization proceeds. When the organization of the roots has made

some progress, the resultant exhaustion having produced a negative condition in the organizing plant to the positive condition of the elements in the air, the organization, by the same law, now proceeds in that direction, forming organs of a different form from the first, but admirably adapted to receive their food from that region.

The complete organization of the plant, with roots, stem and leaves, having exhausted the food stored up by the mother plant, in the language of Prof. Hodgins, it is now in a condition to be weaned, and henceforth must collect and assimilate the food for its further development.

There is now, for a time, a suspension of the process of organization, till the plant has collected and assimilated the material to continue it. In a few days development again commences, and goes steadily onward according to the inherent vigor of the plant and the supply of the food within its reach; a feeble plant, from imperfectly matured seed, though surrounded with the best conditions, making but a feeble growth.

The leaves being the positive pole of the plant, the negative elements taken up by the roots pass up into them, and there meet and combine with the elements in the air; and it is not until the food elements from these two sources are brought together, combined and vitalized, that it is fitted to form the living tissues of the plant. When thus combined and vitalized, both its character and magnetic condition are changed from negative dead matter to positive living material, and by the law of attraction arising from conditions, moves downward towards the roots—the negative pole organizing in its course an additional layer of greater thickness and more compact than the ascending cellular formation; reaching the roots, besides strengthening those first formed, increasing their length and number, forming thin walled cells, called spongioles, which perform the office of taking up the food from the soil. It is only the active cellular portion of the roots that are qualified to perform this office. The walls of the cells press against the soil, and the fluids within acting chemically upon the food elements adhering thereto, liquify them, and, by attraction resulting from elective affinity, and from positive and negative conditions, the food is taken up in the precise proportions the nature of the plant requires. Different kinds of plants take them up in very different proportions, but each kind of plant in the same proportion. Thus each kind of plant preserves its distinctive character. Mechanical pressure, chemical action and the attractions arising from elective affinity and positive and negative conditions, combine in effecting the result.

The life of annual plants is marked by several periods: the first is the organization of the plant from material prepared by the mother plant; the second is the full development of the plant; the third is the collecting and storing up in the tissues the material for the formation of the seed. From the completion of this process the plant ceases

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The embryo plant being positive to the negative food in the earth, the attraction resulting from this condition carries the first movement of the organization towards this unassimilated food, which is ordinarily downward, but which may be horizontal or even upward, according to the locality of the food for which it has an attraction, some plants drawing their food from the upper, and others from the sub-soil, but always in the direction of its appropriate food, getting over, under or around any obstruction in its course, if it can, and often forcing its way through difficult passages. It is this attraction which draws out the organizing cells in the form of capillary tubes. In the infantile state of the organization, the outer walls of the cells only are organized; within, they are filled with the moving sap from which the organization proceeds. When the organization of the roots has made

some progress, the resultant exhaustion having produced a negative condition in the organizing plant to the positive condition of the elements in the air, the organization, by the same law, now proceeds in that direction, forming organs of a different form from the first, but admirably adapted to receive their food from that region.

The complete organization of the plant, with roots, stem and leaves, having exhausted the food stored up by the mother plant, in the language of Prof. Hodgins, it is now in a condition to be weaned, and henceforth must collect and assimilate the food for its further development.

There is now, for a time, a suspension of the process of organization, till the plant has collected and assimilated the material to continue it. In a few days development again commences, and goes steadily onward according to the inherent vigor of the plant and the supply of the food within its reach; a feeble plant, from imperfectly matured seed, though surrounded with the best conditions, making but a feeble growth.

The leaves being the positive pole of the plant, the negative elements taken up by the roots pass up into them, and there meet and combine with the elements in the air; and it is not until the food elements from these two sources are brought together, combined and vitalized, that it is fitted to form the living tissues of the plant. When thus combined and vitalized, both its character and magnetic condition are changed from negative dead matter to positive living material, and by the law of attraction arising from conditions, moves downward towards the roots—the negative pole organizing in its course an additional layer of greater thickness and more compact than the ascending cellular formation; reaching the roots, besides strengthening those first formed, increasing their length and number, forming thin walled cells, called spongioles, which perform the office of taking up the food from the soil. It is only the active cellular portion of the roots that are qualified to perform this office. The walls of the cells press against the soil, and the fluids within acting chemically upon the food elements adhering thereto, liquify them, and, by attraction resulting from elective affinity, and from positive and negative conditions, the food is taken up in the precise proportions the nature of the plant requires. Different kinds of plants take them up in very different proportions, but each kind of plant in the same proportion. Thus each kind of plant preserves its distinctive character. Mechanical pressure, chemical action and the attractions arising from elective affinity and positive and negative conditions, combine in effecting the result.

The life of annual plants is marked by several periods: the first is the organization of the plant from material prepared by the mother plant; the second is the full development of the plant; the third is the collecting and storing up in the tissues the material for the formation of the seed. From the completion of this process the plant ceases

to take up crude food from the soil, and its whole energies are directed to the working over of the stored up material and concentrating its life in the seed. Anderson's experiments show that a corn plant taken from the soil and supplied with water only, when in flower, perfected its seed. The life of biennials is marked by a similar periodicity, with the only difference that, on completing its work of storing up the material for the formation of the seed, the active organs die, and it takes a season of rest and completes its work of forming the seed the following season. The life and labors of perennials, though governed by the same laws, are more complex—a number of seasons are required to develop the conditions necessary to produce seed. Like the biennial, the active organs perish at the close of a season's labor, and it takes a season of rest, till the cosmic conditions return for a renewal of its labors—not immediately to produce seed, but to continue the development of the tree; and after the seed-bearing condition is reached, its labors are divided, a part to the production of seed and a part to the perpetuation of its own life.

At the close of the growing season numerous buds have been formed and the material prepared and stored up for their development. Each bud is am embryo tree, and may be developed as such, independent of the parent, when surrounded with the proper conditions, and it is just as important that the bud should be perfected and the material stored up for its development matured, for a healthy and vigorous growth, as in the case of the seed. At the commencement of growth, in the spring, a similar process takes place to that which took place in the development of the plant from the seed. Water is absorbed; the stored up material is changed into vegetable albumen; new roots and spongioles are formed; the buds develop into branches, and, at the same time, a course of ascending cellular growth takes place on the surface of the previous year's growth; and also, horizontal cells, which enlarge the circumference of the tree. With the exhaustion of the stored up material the terminal bud forms, which completes the organization of the tree for the season's work. In the meantime the material taken up by the new roots is ascending into the leaves, which, as soon as elaborated and vitalized, passes downward, outside the new ascending cellular growth, and, wedging through the horizontal cells, dividing and flattening them. These horizontal cells (called medullary rays) form the communication between the central pith and the bark, and are woven together with the ascending and descending layers, in a manner resembling the warp and woof of a piece of cloth. These different growths may be plainly distinguished in the section of an oak sapling, which I here exhibit. It will be seen that the ascending and descending layers differ materially in their texture; the first is porous and brittle, the other compact and tough and formed of sap in a different condition. It will be perceived that there are three different conditions of the sap: the first is formed from sap stored up the previous year, and forms what may be termed

the infantile cellular tissue. It is followed by the dead food elements, in solution, taken from the soil by the roots, (properly speaking, this condition is no more entitled to be called sap than chyle, in the human system, is to be called blood) which, after entering the leaves, becomes vitalized and assumes a character comparatively analagous to arterial blood, and is fitted to mature and support the first formed infantile structure. It is these conditions and their periodicity that claim the special attention of all cultivators of plants and trees, for in proportion as we adapt our operations to these conditions will be the measure of our success.

If the object be to kill the tree, cut around it when the first infantile cellular structure is forming; if to avoid sprouting from the stump in clearing land, cut down the trees just before the period of the first descending sap—about the first of June—or when the sap from the stored up material is most completely exhausted, for if the tree is cut down when the assimilated material stored up is exhausted, the stump, without leaves, cannot assimilate the material to mature the newly formed roots or send up suckers, and the new roots perish. The only thing that can prevent the immediate death of the stump is the disposition in trees to keep in reserve assimilated material for such an emergency. If a few sprouts are sent up by this reserve, cut them off before they have time to assimilate and send back material, and the work of destroying the life of the stump is complete. During the formation of new roots and spongioles, any displacement of the soil about the roots is always injurious, if not death to the plant. If it be a plant just organized from the seed it must of necessity perish, for all the material stored up in the seed being exhausted in its organization, no more new roots can be formed; but if the plant has time to collect, assimilate and store up a supply of material to meet accidental wants, it may be transplanted and live, but it will be arrested in its growth till new roots are formed and food collected by them and assimilated in the leaves to continue organic formations. This law teaches that in cultivating our vineyards and trees, all deep cultivation that would interfere with the roots, should be done before the formation of new roots commence. The pruning of matured roots by cultivation, which have a supply of material to form new ones, may often be of advantage, but all inteference with the young forming roots must always be injurious. Hence, our deepest cultivation should be early in the season, and should be graduated till it terminates in mere surface stirring, so as to avoid disturbing the active roots.

The first period of the descending sap is usually in progress during the second and third week in June, and it recurs about every four weeks during the growing season. To what extent cultivation and the state of the weather may hasten or delay the recurrence of these periods, my experience does not yet enable me to determine. My experiments have been chiefly confined to apple and pear trees, but we may easily conclude that other trees pass through a similar periodic-

ity, but I am unable to say from observation how near they approximate as to time; but I can say, with some degree of confidence, that during the periods of the descending sap wounds may be made without material injury. They will heal by what surgeons call the first intention—that is to say, the healing will commence immediately. It is this condition of the sap to which the art of governing it may be successfully applied in bringing unfruitful trees into bearing and increasing the size and quality of the fruit, which may be done in various ways, but all acting upon the same principle, which is to arrest or check the return of the sap to the roots, and thereby prevent the formation of new spongioles, which are renewed by every descending course of sap. Consequently, the collecting of crude food from the soil is arrested, but water is still absorbed and the arrested sap ascends and is worked over a second time, and thereby brought to the fruit producing condition. Indeed, there are many reasons for concluding that fruit is only produced from materials worked over the second time. The mildest means for checking the descent of the sap is to bend the branches, which produces partial strangulation. A more heroic practice is to pass a sharp knife, with the edge turned slightly upward, in an ascending circular direction around the tree several times, cutting entirely through the bark; or it may even be chopped around with a hatchet, with the edge turned upward, with safety, if done at the proper time; for apple and pear trees, from the tenth to the fifteenth of June. The fruit on a single branch may be increased in size, and brought to maturity a week or two earlier by taking a ring of bark from the limb. When trees have reached the proper size they may be easily brought into bearing by a proper control of the sap, and some may be surprised to learn that August is the most successful period for grafting. I here exhibit a graft, which was put in in September, which it will be seen has united. Indeed, it may be done during any period of the descending sap.

I might extend the application of these principles to our operations, but I have already trespassed too long on your time and patience. I will therefore close with a few general remarks. My object has been not so much to communicate knowledge on this important subject, as to show that a better knowledge is desirable and attainable. I would not have you take my statements as authority, but to encourage each one to investigate for himself, that he may be guided by carefully ascertained knowledge. That we may pursue our investigations to the best results, it may be well to sum up our present ascertained knowledge and to point out what remains to be sought out and ascertained.

Our present conclusions are that the most potent force in carrying on the circulation of the sap is attraction, arising from conditions which we have called positive and negative electro-magnetic; that the health and vigor of the plant depend on perfect development of the embryo germ, and the maturity of the food stored up for its organization, and that the food furnished by the earth for its development is

not in a free condition, but held by the absorptive power of the soil, and that the root of the plant is drawn to it by the before-mentioned conditions, and that different kinds of plants take up the different elements in different proportions, according to their peculiar nature, by a law of attraction, which we term elective affinity; that in the development of the plant the food taken up by the roots must pass up into the leaves, and combine with elements from the air to fit it to form the living tissues of the plant, and that the plant is developed by ascending horizontal and descending layers; that the ascending and descending layers are from sap in different conditions, and that these conditions at least approximate a regularity in the periodicity of their alternate occurrence and recurrence; but to what extent different kinds of plants agree as to the time of their periods of condition, duration and recurrence, is yet but very imperfectly known. As the success of our operations to a great extent depends upon adaptation to the proper conditions, and as the knowledge needed can only be perfected by years of experiment and careful observations, I invite the coöperation of the members in collecting the necessary facts.

What I have advanced has been gathered chiefly from nature's book. I am aware that I have advanced some views that are in conflict with what has heretofore been taught and received, but I have no favorite theory to maintain; what we are most interested in is to ascertain the truth. If I have made any approach toward a theory, it has grown out of the facts as I found them. We may not have collected all the facts necessary to reach a correct conclusion, or we may not have rightly interpreted the facts. If, therefore, we have advanced anything in conflict with any fact or known law found in nature's book, we hope this intelligent body will point it out, that error may not be further propagated.

Mr. Muir claimed for Mr. Clagett originality for the positions taken, and wished the Society so to declare, in view of the fact that another party (Eugene Roberts?) claimed that honor.

Dr. Spaulding said that he did not wish to deprive any man of his laurels, but that what was claimed as original was as old as he could remember. He had particular reference to the peeling of the bark of trees. He then proceeded to show the office of the outer bark, which was to protect. The inner bark contained the vessels of circulation of sap; that while this inner bark was undisturbed, the outer bark, which served as protection only, might be peeled off without destroying the tree. If it was done at the proper time, he saw nothing difficult or mysterious about it.

Dr. Clagett replied that he did not particularly claim originality, but only called attention to the fact that he had learned from experience that there are times when the bark may be peeled off with impunity, and that there are times when, if this is done, it would de-

stroy the tree. Hence the importance of observing the periodicity of the flow of sap in the practical operations of horticulture. He stated that he would be glad to have the opinions of members upon these points. It was no satisfaction to him to read this paper, unless, from discussions that would follow, some light was thrown upon the subject.

Mr. Huggins: Perhaps it may be a matter of some importance that I relate some facts in connection with my experience. Some three years since I was appointed a committee on fruits, and at the Doctor's request, commenced peeling, early in the season, the limbs of some of my trees for the purpose of experimenting. I peeled a number of limbs at different periods through the season; some died, others continued to bear fruit. Limbs, two and a half inches in diameter, were peeled about the first of June. This was three years ago. That year it matured the crop of apples well; the next crop matured also, and this last season it did the same. It was a matter of some astonishment to me; it may be so to others. This limb is hard as a bone, perfectly black and dry, no life between the limb and the tree. I had two limbs in this condition; I cut off one of them and cut it in the middle, and found that it was perfectly dry and dead. I would like information as to how it was sustained; perhaps some one will be able to give us a little light upon this point.

Question: Was the limb peeled near the body of the tree?

Mr. Huggins: It was peeled six or eight inches from a main limb.

Dr. Clagett: The sap passes up through the dead wood. It is a case of capillary attraction. The condition of the sap changes after reaching the leaves. Now, whether it will take up the sap as freely and support life, I would not attempt to say. In all cases where the bark is thus taken off, there is an undue enlargement above the wound and not below it.

Adjourned.

EVENING SESSION.

JANUARY 10, 7½ o'clock, P. M.

President in the chair.

Mr. Jordan: It has been suggested to the Business Committee that we take up and revise our list of pears to be recommended for general cultivation. I move that we take up and revise our list of pears. Motion carried.

The President gave as the first variety for discussion the Golden Beurre of Bilboa.

Mr. Husmann: I have fruited that variety for several years, and although it is quite a good little pear, it seems to me to be a shy bearer; bears a few fruit every year, nothing extra, nor has it any other quality which I should judge could recommend it for general cultivation. My experience with it has been on the quince stock; it may

perhaps do better on the pear. I have no experience with it on pear roots, and would like to hear who has had experience with it as a standard. There is the Beurre Giffard, which I much prefer.

Passed without recommendation, as six votes were not given.

The Bartlett and Louisa Bonne de Jersey were then separately voted upon, and each of them recommended for general cultivation.

The Flemish Beauty, dwarf and standard, was then proposed for consideration.

Dr. Hull: I object to it as a dwarf. I have no objection to it as a standard.

The President then proposed to go over the whole list again, to ascertain as to the varieties already passed upon, whether it was as dwarf or standard they were recommended.

Dr. Hull: Last summer that question came up in our local society—the question of dwarfing pear trees. I endeavored to establish the point that no sane man would grow dwarfs for market purposes. It resulted in our appointing a committee, who went to the gentlemen's grounds who said that they had had five successive crops on the quince, and the very first pass we made we found a root from the pear stock above the junction nearly as large as the stock itself. In no instance could we find a dwarf which had made two crops and lived.

Mr. Jordan: I move that the Doyenne d'Eté, dwarf and standard, be recommended for general cultivation. Not seconded.

President: The Bloodgood is recommended by the committee, both as dwarf and standard. What shall be done with it?

A motion was made and seconded to strike out dwarf from the report of the committee.

Mr. Husmann: I would like to know whether it would not be well to establish the point right here that dwarf pear culture should be abandoned altogether—it would much simplify our proceedings. If it meets the views of the Society, I would make a motion that we discuss that question first. I make the motion that we take up the subject of dwarfing pears, whether it should be recommended or not.

Dr. Dyer: I move to amend the report of the committee by striking out the dwarfing of all pears for orchard culture.

Mr. Husmann: I do not know whether my friend Dr. Hull considers me a sane man or not, but some how or other I have a notion in my head, founded on some experience, that I am going to plant two or three thousand dwarfs. The Duchesse d'Angoulême I consider one of the finest pears we have on the quince. I have trees four or five years old bearing a bushel and a half or two bushels, some weighing a pound each, and I cannot cultivate it except on the dwarf. The Louisa Bonne de Jersey, Bartlett, and White Doyenne have all produced well, and several other varieties do exceedingly well with me on the quince, and it seems to me to be very hasty to throw out all dwarf culture, when we cannot successfully cultivate some very admirable varieties on the standard. I think I shall put out about two thousand dwarfs,

and I shall confine myself to about a dozen varieties; but this, from my experience, will be a success—as great a success as anything on the pear stock. I am aware that we should be cautious about recommending any variety on the quince, but I do not think it would be a wise course to throw out all quince stocks.

Mr. Smith: There seems to be a growing disposition to discourage dwarfing the pear. I have heard many speak in favor of planting pears on quince, for the purpose of getting cheap trees. I would like to know if that is not desirable for most kind of pears for that purpose. I would like to hear something on that point.

Mr. Kelly: I don't know that I can say anything to alter the opinion of the members. If we look into the history of dwarfing pears in America—it is of recent date—we shall see it was written higher than it really deserved. Men wanted every variety of pear on quince, and nurserymen, to meet the demand, planted all their assortment on quince. They were scattered throughout the country; some were taken care of, and some not. Now, in the last two or three years, we are running into the other extreme, throwing dwarf pears overboard altogether. I have heard some eminent men assert that the only reason they could see for dwarfing pears was to bring them into early bearing. There are other reasons. Standard pear trees take more room. I have examined some trees planted out eight or ten years, and at that age I could not see roots. In some varieties I have seen an effort at throwing out roots. If a man plants out a pear orchard, and he wants a permanent thing, I would advise him to plant out standards; but if he wants to make as much of his ground as possible, he can plant dwarf trees between the standards, and pay the whole expense of his orchard with them. We have some varieties; they are limited, it is true, in comparison with those grown on the standard, and I haven't come across any man yet that ever I heard lay down any good reason why they should be discarded on quince. I think we ought to use a little discretion in the business, discard a good many varieties, and retain others, if it was for nothing else than to fill in our standard orchards with dwarfs. I would suggest a little caution about the business.

Dr. Hull: I would like to ask Mr. Husmann whether he has examined those trees he referred to—these Duchesse d'Angoulême—to ascertain whether they are at this time on quince or pear roots.

Mr. Husmann: I have, and they are certainly not rooted from the pear, because the junction is above the ground. To all appearances, they are healthy and thrifty, and look as if they would last a long time.

Mr. Muir: This circumstance has been brought to my mind, that the quince itself does not do well in my neighborhood in the Meramec soils. I would give up dwarfing entirely in that section.

Mr. Husmann: We have very good success with quinces up our

way, so much so that we consider them among our most profitable market fruit.

The motion for striking out all dwarfs from the report of the committee was put to vote and lost.

Mr. Parker Earle moved to recommend the Bloodgood for general cultivation on pear trees. Carried.

President: The next variety on the list is the Tyson.

Dr. Hull: For market I could not vote for the Tyson; for garden culture I would, on pear stock.

Mr. Husmann: I can say a word for the Tyson. As a dwarf I consider there is no better pear of its season, but whether it is showy enough as a market fruit I am not sure. I have had it bear very abundantly and very fine fruit on the dwarf. I have seldom seen the fruit on the standard, and, therefore, am unable to say anything about it.

Dr. Hull moved to strike out "dwarf" from the Bartlett.

Motion carried, and the Society, by a vote, decided to recommend the Bartlett as a standard.

Louisa Bonne de Jersey was recommended for general cultivation as a dwarf.

The Flemish Beauty was next in order, and, on motion of Mr. Husmann, "dwarf" was stricken off from the report of the committee, and then, by vote, the Flemish Beauty was recommended for general cultivation as a standard.

The Seckel was next in order, and after striking off "dwarf" from the report of the committee, the Seckel was recommended for general cultivation as a standard.

The Belle Lucrative was next in order.

Dr. Hull: When we say "for general cultivation," I suppose we mean for market purposes. If you will say for garden purposes, I will say we have no pear on the list that will compare with it; but for market purposes it is the last one that should be grown, for it has no color to recommend it.

Mr. George Husmann: I have had this fruit bear abundantly and color finely, both dwarf and standard, and I think we ought to recommend it. I am sorry to differ with my friend from Alton, but I suppose different soils bring different results.

Mr. Huggins: This has been a profitable pear for me for market.

Mr. Parker Earle: It is a very profitable pear with us, and gives universal satisfaction.

A vote was taken upon recommending the Belle Lucrative for general cultivation as dwarf and standard, and was carried.

Dr. Hull moved to strike off "dwarf" from the Howell.

Mr. Husmann: I must object to that again. The Howell bears so well with us as a dwarf that I cannot consent to have it stricken off. I have had it bear several seasons beautiful fruit, and the trees look as handsome and flourishing as any I have in my garden.

Mr. Kelly: If we strike the Howell off as a dwarf, it is time we began to think of striking them all off as dwarfs.

Mr. Jordan: I don't know but I ought to say something for my friends, the dwarfs. Our worthy friend on my left (Dr. Hull) is one of the greatest advocates for dwarfs; he does it in a different way, however, by operating on the pear roots. I don't know why we should condemn the system so generally. We dwarf the pear by grafting it on a slower growing stock, others by pruning its roots, making its roots more fibrous by hard labor; we do it by putting it on a stock that is already fibrous. I know that many of these varieties do well on quince stocks, and the Howell among a few others. I would advise putting on a quince stock.

Mr. Kelly: I suppose it is understood that by "dwarf," we mean pear grown on quince stock?

Mr. Husmann: Allow me to say one word. If I am to prefer one kind of dwarf, I would rather prefer those on quince roots than those dwarfed after Dr. Hull's method.

The Howell was, by vote, recommended for general cultivation as dwarf and standard.

The question was then put on recommending the Buffam for general cultivation, as reported by the committee, as dwarf and standard. There not being six votes in the affimative, this variety was passed without recommendation.

The Beurre Bosc was recommended by vote for general cultivation as a standard.

The Beurre d'Anjou came next in order on the report of the committee, but on putting the question there were not six votes in the affirmative, and it was passed.

Beurre Diel was next in order.

Mr. Husmann moved to strike off "standard." Not carried.

The question was taken upon the report of the committee recommending it as dwarf and standard, and the Beurre Diel was so recommended.

The Duc de Bordeaux came next in order. There not being six votes in the affirmative, this pear was passed without recommendation.

The Laurence came next in order.

On motion of Mr. Earle, it was voted to recommend it for general cultivation as a standard.

The Glout Morceau was next in order.

Dr. Hull: I will vote for it both ways. It does very well on quince, but equally well as a standard.

Mr. Jordan: I think this is one of the varieties that we had better not recommend. My observation in this locality is, that it blights very badly. Some of our very finest trees on quince, that looked from their growth as though they were standards, just as they were ready to bear, blighted.

Mr. Kelly: I don't think we ought to exclude a variety on account

of its blighting with some growers. Some growers will tell you one thing and some another. It depends entirely on location and soil.

Mr. Huggins: I have that tree only on quince, and I find it one of the worst to blight of any I have. I, for one, could not recommend it on the quince.

Dr. Hull: We have made quite an extensive list of pears this evening, and they have been mostly pears that ripen nearly at one time. It is a fact that we have but few winter pears, and this is one of them that can be kept until January with fair treatment, and I should on that account be in favor of retaining it. There is no difficulty in preventing it from blighting, if you will put it on a pear stock and prune it a little.

The question was then put upon recommending this variety as dwarf and standard. There not being six votes in the affirmative, it was lost.

Dr. Hull moved to recommend the Glout Morceau for general cultivation as a standard. Carried.

Mr. Kelly moved that it be recommended for general cultivation as a dwarf. There not being six votes in the affirmative, the motion was lost.

The Winter Nelis was recommended for general cultivation as a standard.

Buerre d'Aremberg was voted upon as dwarf and standard. But there not being six votes in the affimative, was passed.

The Easter Beurre came next on the list, and a motion was made to strike out "standard" from the report of the committee.

Dr. Hull: It is the best pear that has ever reached this country. There is more money to be made out of that pear than all the balance of the pears put together, on the pear stock. It will sell in Boston at six dollars per dozen.

Mr. Kelly: I suggest that the members would pause a little before we strike it out as a standard. It ever bears itself as a dwarf, and I don't know any better pear as a standard.

The motion to strike it out as a standard was lost.

Mr. Earle moved to recommend it as a standard. Motion carried.

Mr. Husmann: I propose the Passe Colmar as a winter pear.

Mr. Kelly: It is very apt to overbear unless it is attended to. It is so uncertain in its quality, that unless we are going to take in the whole list of pears, I would not feel like recommending it. You will sometimes get it very good, and sometimes very insipid.

There not being six votes in the affirmative, this pear was not recommended.

Mr. Husmann: I now move to add to the list the White Doyenne. My experience with it is favorable from beginning to end.

Mr. Jordan: It is beginning to crack in certain localities, and being thrown out by certain cultivators, I think we should be cautious about recommending it.

Mr. Parker Earle: I think the only question about that pear is, whether in this climate and on our soils it cracks. If it is free from that difficulty, I presume my friend, Mr. Jordan, would be willing to adopt it in place of almost any of the varieties we have recommended as being the best pear of its season. I wish to gain some knowledge of that matter, about its cracking in this neighborhood.

Mr. Kelly: I think that pear is laboring under a cloud here that it does not deserve. I haven't seen any cracks or scabs on it about St. Louis. I have seen some very fair crops, and I think now we have so long a list we had better let that in.

Mr. Husmann: I have had that pear for twelve years. It never failed to bear a good crop, and I have never seen it crack. I have often had it as large as the Bartlett, and twice as good.

Mr. Votaw: I must praise the White Doyenne. I have seen no perfect fruit in my orchard among seven varieties but the White Doyenne. I never saw one crack. I have never raised a good pear of my own planting but the White Doyenne.

Mr. Huggins: I have fruited it several years in succession. It don't crack; it is always fair.

Mr. Earle: I have seen it for four years in Southern Illinois, and I have never seen one cracked. I have heard it suggested that the cracking in that pear and some others, might be remedied by higher cultivation, perhaps by liming, as it certainly is in our locality the case with certain apples—for instance, the White Winter Pearmain; good culture will produce a good, fair crop of apples the next season, of that variety. I don't know whether the same thing would be true of the White Doyenne pear. I hope it may be so. If we can avoid that difficulty, we can afford to let it in on a very short list of pears. There is nothing better when it does not crack.

The White Doyenne was adopted, and added to the list of pears recommended for general cultivation, as dwarf and standard.

It was moved that the Osband Summer, dwarf and standard, be placed on the list.

Mr. Jordan moved to amend for family use, not for general cultivation. Not seconded.

There not being six votes in the affirmative for adding Osband's Summer to the list, it was not recommended.

Mr. Earle: I move to recommend the Vicar of Winkfield as a dwarf.

Mr. Huggins: In my experience, as a dwarf, it has proved profitable.

Dr. Hull: Is not the Pennock apple profitable at your place?

Mr. Huggins: Yes, and I cultivate it.

Mr. Husmann: I would like to vote for nothing as insipid as that pear.

Dr. Hull: I coincide.

The Vicar of Winkfield, by vote, was recommended as a dwarf.

Mr. Redfield: I move to recommend Stevens' Genessee standard for general cultivation.

Mr. Kelly: I would like to get a little information about that pear. I have two neighbors who have it growing not more than three quarters of a mile in a direct line from one another. Their soil is about similar. One curses the variety; he says it invariably rots. The other calls it one of the very best we have. One never saw it rot, and the other found it to rot invariably. That rotting propensity is not a characteristic of the pear, so far as I know.

Mr. Husmann: One tree of mine has rotted invariably, and other trees have been perfect. The rotting is owing somewhat to the soil and location. It is a very good pear when it does not rot.

Mr. Huggins: I have grown it and it does not rot.

There not being six votes in the affirmative, this pear was not recommended.

Dr. Hull: I move that the recommendation of the Belle Lucrative be qualified so as to read "for family use." The pear lacks color. It is the best thing of its season, perhaps, but we have recommended showy pears, ripening at the same time, which will outsell it in the market, but in the family, nothing is better.

Mr. Kelly: We have several varieties more showy, but I doubt if we have any, that ripen at the same time, equal to it in quality. The motion was lost.

Mr. Earle: I move to recommend for general cultivation the Duchesse d'Angoulême, dwarf and standard.

Dr. Hull: I object. It is insipid; not of good quality.

Mr. Jordan: It is one of the very finest pears on the quince.

Mr. Husmann: I have had as fine Duchesse d'Angoulême this fall as Sekels or any other pears, and I believe it is because Dr. Hull cultivates it on the standard that he finds it insipid. I had a very poor opinion of the Duchesse d'Angoulême, until I got it on the quince.

The Duchesse d'Angoulême, dwarf, was recommended for general cultivation.

Mr. Earle: I name one other pear, simply to elicit information, if there is any to be had, and that is Dana's Hovey. I do not know anything about it, except what I saw in the East last fall. It was very highly recommended there as a winter pear.

Mr. Redfield: I move to recommend the Richardson pear, for general cultivation, as a standard.

Mr. Huggins: I presume it is not well enough known to vote on. I would say of it, however, that it is a seedling on a farm of an uncle of mine in New Hampshire. It has been propagated in a small way by myself. It is a pear that I marked about the 25th of July. It is not to be compared with the Bartlett for eating; but there is money in it. I have received, in Chicago, eighteen and twenty dollars a barrel for it, and fruit sellers call it the best pear in the market, for its season, that has yet appeared. I give that as its history. I think it is a profitable pear with me, and would prove so with fruit growers here, and especially further south.

Mr. Husmann: I recollect seeing that pear at Dr. Hull's last summer. It was certainly a fine looking pear, but I had enough of it when I came to taste of it. I would inquire whether it is uniformly of such poor quality; if so, I would feel sorry to recommend it, although it is a beautiful thing.

Mr. Huggins: This pear was very ripe at the time it was shown at Dr. Hull's. I felt desirous to show it at the Alton meeting—it was then very ripe. I will say I shipped it the last of July of this year, about the 25th.

There not being six votes for recommending this pear, the motion was lost.

Adjourned until half-past nine o'clock, A. M., the eleventh day of January, A. D. 1866.

MORNING OF THE THIRD DAY, 9½ O'CLOCK.

The President in the chair.

Prayer by Professor O. L. Barler.

The President: The first thing in order is an essay from Mr. Colman.

Mr. Colman: I do not expect to enlighten fruit growers in anything that I can say upon the subject of orchard culture. But as you have requested me to say something upon this subject, I will proceed, in hopes of being able to offer a few suggestions profitable to beginners.

Mr. Colman read an essay on "Orchards."

The essay was received and ordered on file.

The President: It will be seen by reference to the programme, that short essays are solicited on subjects of interest to horticulturists. It is now in order to read any essays of the character indicated.

Mr. Colman: I spoke to my friend, Dr. Peabody, to prepare an essay for this body. I do not know whether he has done so.

Rev. Mr. Peabody: The subject to which I call attention may be entitled

THE MORAL AND RELIGIOUS ASPECT OF HORTICULTURAL PURSUITS.

Men always choose their pursuits in life under the impulse of some controlling taste or passion, or prejudice. Of these, the two which seem to be most prominent in leading men to engage in horticultural pursuits are the love of acquisition of money making and the love of nature and rural scenes. These two tastes or desires seem to be natural, and are implanted in us by the Creator for some wise and beneficient purpose. The desire for acquiring wealth is not very early developed,

but it is immensely stimulated as age advances, and usually grows stronger and stronger till the close of life. A love for the beauties of nature, on the other hand, is among the earliest developed tastes, and seems to be coextensive with our race. Children are almost always fond of flowers. They love the woods, the trees, the meadows, the hills; but this natural taste, so strong, so universal at first, is often obscured, and nearly destroyed in some cases, as age advances. There may be some other motives that lead men to cultivate trees and gardens, such as the regaining of lost health, etc., but I take it that the two motives above stated are paramount to all others as a general fact.

Now, if a man has no horticultural taste whatever, but engages in horticultural labors merely for the sake of the money he expects to make, his object is all well enough, and I suppose we have no business to quarrel with him concerning the means which he proposes to himself for accomplishing it. But he will not, probably, be very much benefited by the moral uses of horticulture, nor will he appreciate the views I am going to present. The benefit of his pursuit to himself will all terminate in his pocket.

But our noble pursuit, both in theory and practice, leads its true devotees into higher walks, and opens before his vision sublimer scenery than that which is afforded or can be produced by money. Wealth, honestly acquired, is not to be despised. It is always useful in its place, and the true lover of nature knows very well how to appropriate it to the benefit and adornment of life. The full moral uses, therefore, of the pursuit of horticulture can be appreciated only by those who, besides and in addition to all other motives, have for it a true love, founded in a taste for the beauties of nature and natural scenery.

1st. The first of the moral uses of horticultural pursuits which I shall notice, is that it tends to sooth the mind and benefit the heart when oppressed with affliction and sorrow. Suffering is the inevitable lot of mortals. No certain means have ever been devised for averting it. But, like the bite of the fiery flying serpents in the wilderness, there are means provided for its cure. Next to the consolations afforded by faith in the Divine Redeemer, especially to minds alive to the beauties of nature, stand the fields, the trees, the fruits, the flowers, as well as those labors and cares which embrace their culture. To a mind overwhelmed and paralized by some sudden bereavement, anything to occupy it will sometimes afford relief. How much more potent for good in such a case are those objects and cares for which there is naturally a strong taste. You cannot give a person, long confined to a bed of sickness, or oppressed with an overmastering sorrow, a higher pleasure than to place in full view upon the table a vase of beautiful flowers. We bring our choicest boquets to the house of mourning, and we scatter them on the funeral pall. We deposit them in the coffin beside the remains of the loved and lost. Why? Not because

the speechless dead can appreciate the gift, or cares for the sweet perfume, but because parents, friends, brothers, sisters, dear ones, do appreciate it, and find in these delicate testimonials of friendship heartfelt consolation. You take your city friend, when his home is invaded by death, to your country seat; you show him the garden, the trees, the flowers; you interest him, if possible, in the delightful labors which occupy your own thoughts. In the contemplation of those scenes and objects he will find relief and comfort. Should your own home be thus overcast with clouds, amid these same scenes and occupations you will find comfort and repose. In the city, under the pressure of disappointments and bereavement, men are often driven to suicide. But in the country, amid the glories of the fields and gardens, such catastrophies very seldom occur.

2d. I notice in the second place that horticultural pursuits promote physical healthfulness, and this reacts beneficially upon the mind and heart. No man can be happy, or enjoy the higher walks of his intellectual or moral being, who is a dispeptic. A crazy body, with a diseased liver and an abnormal spleen, with rheumatism in the limbs and aches in the head, is never a dwelling place for a happy and contented spirit. A human soul in such a tenement, though it may be adorned with many excellencies and virtues, is neither joyful nor happy. Nor can it even rise into the pure serene atmosphere of high moral excellence. When the moods and aches of such a man are on him, he will snap and snarl if you but look at him. Now, take that man away out of his counting house—away from sedentary pursuits, and the unnatural luxury of his city table—put him behind the plough, let him climb up and prune the apple trees, start him, knife in hand, out among the vineyards, let him dig with the hoe around the rose bushes; make him do all this, and if you can succeed in keeping it up long enough, you will make him over into a new physical man. This fresh new vigor of body will react upon his higher nature. He will become cheerful, happy and contented, his heart will be drawn towards the author of health and of all good, with gratitude and praise. A practical horticulturist, who enjoys such means of physical health, ought to be a far better man than other people.

3d. Again, horticultural pursuits assist in cultivating a taste for the beautiful in nature and art. This taste is a developement of the most refined qualities of the human soul, and belongs to its noblest activities. Cultivated and refined by constant communings with nature, a taste for the beautiful will lead its possessor step by step upward into higher walks than this earth affords, even among the sublimities and beauties of God himself. All art is founded in nature. If a painter wishes to produce a landscape, he will never think it out in his studies, but he must go out, pencil in hand, among the fields and trees. When he has finished a beautiful picture, who will likely appreciate it most highly—he who never saw a waterfall or a meadow, or he whose pursuits have long led him among trees and groves and fruits and flowers?

Thus the man whose life and labors make him familiar with the beauties of God's wonderful works, will come to have a mind and a heart to appreciate them. This will give him a higher position among the good and noble of earth, and among the still nobler intelligencies of heaven. The history of Andrew Jackson Downing will illustrate what I mean. Brought up in his father's nursery among plants and trees, he learned from his earliest years to love fruits and flowers, and to appreciate the beauties of the lawn. Thus, he acquired such a correct taste for the beautiful, that although cut off in early life by the hand of accident, his genius and his taste have impressed themselves deeply upon the American mind, and his standard works on trees and landscape gardening have been noticed with approbation by the highest English authorities. Had he been born and reared in the city, and spent his youth among ledgers and bills of exchange, he might have been a successful merchant, but he never would have led the van of American pomology and landscape gardening, nor would American taste or those subjects have arisen to its present state. I do not say that every young devotee of flowers and fruits can become a Downing, but I do say that the bright and beautiful path which Downing trod lies open before us all.

4th. I will add, again, that horticultural pursuits afford the means of carrying out the true idea of a Christian home. The human race commenced its grand career in a garden. It follows that the natural home for the organized family is among the beauties of nature, in the midst of trees and fruits and flowers. The unsophisticated taste for rural scenes observed in little children—those true representatives of humanity—indicate that there is still a strong desire in the race to get back into the garden again. How often, also, do we see among the families, even of the poor in our large cities, still stronger proofs of this desire. Pent up in close, ill-ventilated habitations, you will often observe that they have a little mimic garden in the window.

"There the pitcher stands,
A fragment, and the spoutless tea-pot there—
Sad witnesses how close-pent man regrets
The country. With what ardor he contrives
A peep at nature when he can no more."

"Are these not all proofs
That man, immersed in cities, still retains
His inborn inextinguishable thirst
Of rural scenes, compensating his loss
By supplemental shifts the best he may."

The practical horticulturist not only is able to have his home in the country amid its rugged beauties, in the pleasant sunshine and the pure air, but that home he can embellish and adorn with the choicest of nature's gifts. He can make it to his children the most attractive spot on earth. That well shorn lawn, sprinkled here and there with

beds of the brilliant verbena, and the blushing rose, with clumps of evergreens, and perchance yonder a lofty elm, while beyond the eye takes in the garden, the orchard and the vineyard, hanging with golden fruit. That indeed must be a truant boy who can tear himself away from the paternal roof when embowered in the midst of such a scene of beauty. With such surroundings, you may not only have the pleasure of seeing your children attached to their home, but, far removed from the allurements and temptations of the city, you may have the still higher pleasure of seeing them growing up with vigorous health, with correct tastes and virtuous habits. It matters but little if they do lose a few of the little quirks and conventionalities of polite city etiquette. They will have acquired that which will be of infinitely more value to them as the future men and women of the land we love. The city merchant, or manufacturer or mechanic, sees his children a few moments in the morning, and then departing to his pressing cares, knows nothing more of them till night, when he returns jaded with toil or the excitement of business to his dwelling. How can he thus meet the high responsibilities of a parent? But the horticulturist takes his children to the garden, the field, the orchard; he explains to them the wonders of nature's laboratory, and early trains them to all the manipulations of the horticultural art. He becomes their teacher, their protector, their friend. Thus, by faithfulness and care he will have the high satisfaction of seeing his children grow up, clinging to their parents like the vine to the trellis, and like olive plants around his table.

5th. Finally, horticultural pursuits throw open to the human mind the book of nature, which, if carefully studied, especially with the purer light of revelation falling on its glowing page, will lead the careful student of it to a knowledge of Him whose wisdom and skill and benevolence is seen in every opening petal and in every fluttering leaf. It is impossible for any man who observes and seasons at all, to watch the wonderful changes and developements in the garden and the orchard, without seeing in it all the mysterious power of the great Creator. Let me congratulate you then, brethren of the Missouri State Horticultural Society, that your noble pursuit places you in a position where you have the opportunity of daily looking "through nature up to nature's God."

The essay took the usual course.

The President: Are there any other volunteer essays to be read?

Mr. Saxton: I understand that Mr. Jordan has an essay which he would like to present to this Society, and as he is on the Wine Committee, and will have to be absent soon, I move he be allowed to read his essay now.

Mr. Jordan read his essay on horticulture, which was received and placed on file.

Mr. President and Members of Missouri State Horticultural Society:

I love to spend a few hours in viewing the works of nature, as they are spread out before us, in our beautiful hills and valleys, lakes and rivers, mountain peaks and rolling prairies, and there is a grandeur in the works of creation that fills our souls with awe, and we stand dumb before our Creator who has made these things, and ask, what can we do. We, that are a part of this sublime creation, formed to carry out the designs of the Great Architect of the universe. We have a work to do, and it will be well for us if we do it right, and fulfill the end for which we were created.

We hold up the present chart of the world, and view it with so much pleasure, in contradistinction to the antediluvian, patriarchial or apostolic times. We boast of rapid strides in improvements, show our railroads, steamboats, telegraphs, printing presses, and beautifully adorned homes, and wonder how the great and good of bygone centuries could enjoy life without these. We ask, who can calculate the benefit, past or prospective, of one invention like the Lucifer match. And when we see so many thousands of improvements, small as the pins and needles of every day life, we say, what a piece of work is man.

Could we obtain from the Architect of the universe a copy of the working plans for the next thousand years, and see the work to be done. If we march on at our present rate of progress, we can safely say, then men then engaged in their hurried pursuits, will dispose of the slow speed of railroads at sixty miles an hour, but will cut themselves loose from earth, and navigate that more subtle fluid with little to impede their flight; then man will control the winds, and make them do his work, as we do the lightning now. Then the summer's heat and winter's cold will be so mingled to form one perpetual spring and autumn; then, man will be able to say to the hurricane, goaded on by the lightning's crash, "peace, be still," and it will obey. Then man will have undisputed dominion, and sit under his own vine and fig tree.

Mr. President, I do think, in view of the rapid march of improvements, horticulture has advanced and kept pace with others, and in the future it will not be found in the rear, although the field opens wide before us, and nowhere in the country has the horticulturist such a wide range for operations as in this Mississippi valley. We not only have the extended prairies to plant with timber and fruit, but we have the mountain slopes and fertile valleys to clothe with Pomona's richest robes. The word horticulture is derived from the Latin *hortus*, a garden, and *colo*, I cultivate, and used to apply to the kitchen garden, where vegetables, herbs, flowers and ornamental shrubbery, as well as fruits, were cultivated. My friends, would it not be well for us at this meeting to devote a small space of our time in

selecting and recommending for general cultivation shrubs, flowers and evergreens to adorn our homes and pleasure grounds, to gladden the eye and inspire within us higher and more noble views of creation.

In the infancy of civilized society, a garden was a limited piece of ground attached to the house, in which were cultivated various vegetables, fruits and flowers for the use of man; but as mankind advanced in refined civilization, and the number of objects to be cultivated increased, it became necessary to adopt separate departments, and culinary vegetables are cultivated in the kitchen garden, fruits in the orchards and vineyards, flowers in the flower garden, ornamental trees and shrubs in the shrubbery or pleasure grounds, trees in plantations, woods and forests. So horticulture, in this extended sense in which it is at present used, is no longer confined to a limited inclosure, but extends over our mountain tops and widespread, undulating prairies. Not unfrequently do we hear of trees, shrubs and vines cultivated by a single man being numbered by their thousands, and embracing every variety of plants, to add to our utility, comfort, convenience and luxury.

A botanical garden devoted to the culture of a collection of plants, with reference to the science of botany, is of great utility to the horticulturist, and I hope the lovers of the good, the useful and the beautiful, will avail themselves of the benefits to be derived from the botanical garden in our midst, and assure our worthy friend, Henry Shaw, that we appreciate his untiring efforts in establishing this garden, and his intention to leave it as a legacy to the city of St. Louis; and may we not, as horticulturists, lend our influence, by suitable expressions, to encourage the good work so nobly began.

Who can estimate the benefit to be derived from one such garden as there is at Paris, London or St. Louis, by testing the merits of trees and plants, and then recommending or disapproving of their culture.

And, my friends, I do believe a brighter day will soon dawn upon the agricultural and horticultural department at Washington, when we will have a man at its head who will study to advance the interests of the county, by so managing the department that it will rise above a mere political gambling shop—and may we endeavor to bring about this change so much desired.

Horticulture in Missouri is marching on "like an army with banners." Although in its infancy, it is gigantic in its dimensions; and at no distant day it will stand at the head of the great enterprises, and railroads will have to be constructed to carry fruit, and fruit houses built to preserve it, and thousands employed in handling it, from the producer to the consumer. Happy, proud and thrice redeemed Missouri, march on to wealth and power!

My friends, we have great reasons for thankfulness, that we are so favorably situated geographically, with a great diversity of soil, suitable to various fruits; a vast expansion of country suitable to the enter-

prise of horticulture, greater (I can safely say by far, without boasting,) than any other State in the Union, and it is fast filling up with those enterprising, go-ahead men that will make Missouri's name cap the climax of horticulture in its broadest sense. Permit me to call your attention to the many favors we are receiving from the railroads of this State. I am pleased that they set so good an example to the railroads of their sister States, showing that the managers of the railroads of Missouri are alive to their own interests.

In conclusion, let us remember that the National Pomological Society meets here next September, and I can best express my desires by saying, let us show our friends from abroad that we were worthy the favor conferred upon us; let us not only show we have large rivers and valleys, orchards and vineyards, but we have large hearts and open hands—and I, for one, believe we shall do it.

J. M. JORDAN.

The President: There is still opportunity for additional voluntary essays. If any members are prepared, I hope they will avail themselves of the opportunity.

Mr. Taft: I have not a written essay, but will give a verbal account of my method of planting an orchard. The plan which I adopt, and which I would suggest to others, is to take a plow and good team, and strike out a furrow; after the first round, I set the plow deeper, say eight inches. In this way we have a hole eight inches deep and four feet wide, and the whole length of the orchard. Then, with a spade, the trees are set in their places; then, to make the work lighter, we take a one-horse plow and throw the dirt back, ridging up so that the trees are enabled to endure either a dry or wet season better than any other method. There is always a drain to carry off the surplus water. Then it is by this method so much quicker done. I have tried this method, and find that it works well. Last season I planted two thousand trees, and lost not more than four or five. The season before I planted a quantity, and lost very few. I think it would be well if this plan was generally adopted.

Mr. Mertfeldt, editor of the German *Prairie Farmer*, (Chicago,) after speaking of the harmony existing between the fruit growers of Illinois and Missouri, arising from the genial character of the gentlemen composing the horticultural societies in these States, and the channel for taking their produce to market being this great river that otherwise separates the two States, read the following notes on "Missouri and her Future."

The close of a calamitous intestine war, in the issues of which lay the life or death of a nation, and in which Missouri was very deeply interested, permits us to come together now, not to speak of or listen to stratagem or recitals of battles fought or brothers slain, but in peace and harmony, to speak of greater developments of the arts of peace, and to devise the best mode of "beating our swords into plow-

shares, and our spears into pruning hooks." For long years the exceptional few only of your State have enjoyed the health-giving, invigorating and luscious fruits, which every valley and hillside of your broad State is capable to place into the hands of the million. Missouri is so happily situated with regard to climate, that the hardy apple, the delicate pear, the luscious peach and the refreshing grape, all prosper on her soil, while every kind of berry, *literally the fruits*, grow with the greatest luxuriance.

In speaking of the natural resources of your noble State, something should be said of the noble river which taps your great Northwest and flows on your eastern border. While not dispising or underrating the artificial ties, they are, we must say, limited, even in all their ramifications, when compared to the "Father of Waters," which is able to bear upon his broad bosom, not only the products of the united industry of our own State, but of all the States watered by his tributaries for thousands of miles.

The decade upon which we have just entered will pour into your midst an immigration unsurpassed in wealth or intelligence by the influx of any ten preceding years, which will greatly enlarge the area of your cultivated lands, work your mines of mineral wealth, fill your workshops and man your railroads and steamboats. To the latent horticultural element contained in this homogeneous mass, you, gentlemen, are to give direction. This self-imposed trust faithfully performed, will make "your hills and valleys blossom as the rose," literally "flow with milk and honey," and your presses "burst out with new wine."

I would not, by any means, overlook or undervalue the strong iron bands which are to traverse your State, to bind with the strongest ties the East and the West. Over these must pass the wealth of the Indies, as well as the golden sands of California and the Rocky Mountains; but when this great connection is once made, you will have, by a great many, to increase the fleet of steamboats lying at your levee, because the Atlantic and the Eastern States are reached at a much cheaper rate over the great national, natural highway, which passes from St. Louis, on the eastern border of your State, to the ocean.

St. Louis, too, has a great and glorious future. In the opinion of the writer, it is not the "idle dream of a vision" which beholds in her the capital of this great nation. The central location, the natural and artificial connections with our whole continent, seem to point to this spot as the nation's center.

Horticulture, this delightful and pleasing science, looks to you, then, gentlemen, for its future development in your great and noble State. You have everything to encourage you; your climate is propitious, your winters are shorter and milder than with us of the more vigorous North. I think that the work is in the right hands, the burden upon the right shoulders, and that last, though not least, the right brains are at work to complete this self-imposed task. If you

labor not for self-aggrandizement, but, faithful to your trust, labor for the good of all, your children's children will rise up and call you blessed.

The essay was received, and ordered to be placed on file for publication.

Mr. Saxton: I would like to read a resolution. It is well known that I have been connected with agriculture and horticulture for many years, and I am anxious that the people should read more upon the subject. The resolutions have reference to recommending the agricultural papers of the country.

Resolved, That this Society recommend to the inquiring horticulturist the following periodicals, viz:

1. The *Rural World*, edited and published by N. J. Colman, St. Louis. Bi-monthly, $2 per year.

2. The *Prairie Farmer*, edited and published by Emery & Co., Chicago, Illinois. $2 per year.

3. The *Horticulturist*, Geo. E. & F. W. Woodward, New York. Monthly, $2 50 per year.

4. *Gardner's Monthly*, Thomas Meehan, Philadelphia, $2 a year.

5. The *American Agriculturist*, Orange Judd, New York, $1 50.

6. The *Country Gentleman and Cultivator*, Luther Tucker & Son, of Albany, New York, $2 50.

Dr. Clagett: The committee appointed to suggest the time and arrangements for the meeting of the American Pomological Society are now ready to report.

The report was read.

Dr. Hull: I would like to see the report of the committee amended. Our Illinois Society appointed a committee to coöperate with this Society. I see from this report the whole duty is thrown into the hands of this committee. I would like to see the report so amended as to admit of coöperation with the Illinois Society.

Dr. Clagett: I would like to explain, when, perhaps, all will be satisfactory. It occurred to me that we wanted a local executive committee near St. Louis, and that that committee should act in conjunction with committees from other States. It was suggested that we have one appointed from each congressional district in this State. It would be impossible in this way to secure an active executive committee. It seemed to me that it would be better to appoint those who could get together and who would attend to the business. I expected, however, that the report would be amended, and for one I have no objection to the proposed amendment.

Mr. Guye: I move that the report be referred back to the committee to report again. Carried.

Rev. Mr. Peabody: Mr. Chairman: We are now on the third day of our work, and it seems to me that we have not yet got into the cream

of it. It appears to me that we should pitch into the grapes and vineyards, etc.

The President: The Committee on Vineyards should have reported on the first day, but as Mr. Flagg, the chairman of the committee, was absent, the matter was postponed, and he has not yet arrived. Mr. Husmann is a member of that committee.

Mr. Husmann: As a member of that committee, I have deferred the preparation of any report, leaving it for the chairman, Mr. Flagg, to do this. I have been too busily occupied, and have not been able to write up a report. But, if the Society desire it, I can make a short verbal report of what I have seen and observed this fall.

The President: There is no objection. Mr. Husmann will proceed.

Mr. Husmann: My observations have been very limited, but still, so far as it has extended, it may be of some interest to others. I paid a short visit to my friends at Alton, and I shall speak first of what I saw there. When at Alton, some time in July, I believe it was, I visited the vineyard of Mr. McPike. I was very much pleased with the system and order of his vineyard and in the splendid show of fruit, not surpassed anywhere. I there saw Concords, Catawbas, Delawares, and several other varieties, all promising well. There was a splendid show of grapes, and I learn that its early promise has been fulfilled. I made, also, a short visit to see my friend Dr. Hull. I was very sorry to see that there the former experiences of our Alton friends were not verified, viz: that the Catawba would not rot in their neighborhoood. It certainly rotted there as badly as anywhere. The Doctor's vineyard showed pretty good cultivation, though not as good as Mr. McPike's. When I was there, at least one-half of the crop was gone, destroyed by mildew and other diseases to which the grape is subject. The Concord, the Delaware and the Clinton looked fair, and the foliage looked very healthy. Nearly all my other observations have been confined to my own vineyard at Hermann, and I will only speak in general terms of the manner in which the different varieties have behaved themselves during the past summer. We had great hopes in the beginning of the season of a large crop of Catawba, but, unfortunately, our hopes were destined to disappointment. The crop looked well until about the first of August, then the rot and mildew set in in consequence of the excessive wet weather, so that the average crop was not more than one hundred gallons of wine to the acre. Next, I will speak of the Concord. It has rotted more or less in all the vineyards. In my own vineyard one-half was taken by the rot; still I made, from two-fifths of an acre, one thousand and thirty gallons of wine, which is at the rate of two thousand five hundred gallons per acre. Mine was the largest crop in the neighborhood. I think, perhaps, an average crop in the neighborhood was between one thousand and one thousand five hundred gallons per acre. The Norton's Virginia kept up its old reputation. It showed no rot or mildew, but to some extent was attacked with the white phirp (?). The crop was

unusually large; I think we can say that there was an average crop of eight hundred gallons wine to the acre. Some vineyards yielded one thousand three hundred gallons per acre.

Mr. Colman: What is the price per gallon?

Mr. Husman: Four dollars. The Herbemont made a large crop and has made a good quality of wine. I made one hundred and twenty-five gallons from one-twelfth of an acre. The Clinton turned out well and made a pretty fair wine, but from all the observations that I have been able to make cannot be recommended as highly as the Concord. I think the wine is generally inferior to that of the Concord, though the wine is good.

Mr. Colman: Did it rot any?

Mr. Husmann: No, sir. The Hartford Prolific did well. My vines averaged thirty pounds to the vine. I think it will make fair wine. Among other varieties giving great promise, I will mention the following: The Rulander, which bids fair to surpass in quality the Delaware.

Dr. Spaulding: Is it not a foreign variety?

Mr. Husmann: I think not. But one of the most promising I have seen is the White Seedling, raised by Mr. Miller at ——. It has all the healthy habit of the parent vine. It is a vigorous grower, hardy and superior in quality to the parent vine. I have great expectation of this vine for being the leading grape for white wine. Taylor's Bullitt has also done well. I think that variety has been too much neglected. I find that it needs age before it comes to its full productiveness. What vines I had did well. It would be well to call the attention of planters to it and have them try it. It has been neglected. The Delaware, I am sorry to say, succeeded badly. It shed its foliage, fruit did not ripen, dropped off, and was almost as much a failure as the Catawba. The few grapes that did mature made an excellent quality of wine. There seems to be peculiar locations where the Delaware does well.

Dr. Spaulding: Will Mr. Husmann indicate the peculiarities of this location?

Mr. Husmann: On the north side of the Missouri river, in the region of ——, the soil is very loose and friable, with limestone foundation. The soil seems soft to the foot pressing it. I saw Delaware vines planted there eighteen months ago, with an average growth of twenty to twenty-five feet. I saw one year old vines twelve feet in length.

Mr. Redfield: The soil was somewhat similar to that at Alton.

Mr. Husmann: Something similar.

Dr. Spaulding: Is it desirable to have the vineyards slope to the south?

Mr. Husmann: I think such a slope is favorable.

Another grape which promises well is the Creveling. I am inclined to believe that it will prove to be an excellent wine grape.

Rogers' Hybrid, No. 1, has borne this test well. It set this year a

fine crop of fruit, which developed well, and was not affected with the rot or mildew. I would call the attention of planters to this variety. No. 15, cannot speak favorably of it. It rotted badly with me. These, Mr. President, I believe are about the varieties which give promise, and which have come under my observation. There are others that are healthy and productive, but I think we ought not to recommend anything of poorer quality than the Hartford Prolific. There are two other grapes, the Iona and the Israella. The Israella stood the season well, but the quality of the fruit is inferior to the Hartford Prolific, and is four or five days later in ripening, and I cannot see anything in it worthy of recommendation. The Iona rotted worse than any other variety that I had—so badly that I did not get twenty berries out of twenty bunches. I was sorry to see this, for, from what I had seen of this grape East, I had hoped better things. I am afraid that it is tinged too much with Catawba blood; but as it is a grape of such excellent quality, we ought to try it, but to be cautious not to try it on too large a scale.

This, Mr. President, is the sum of my observations on grapes, and I hope the Society will excuse me for failing to prepare a fuller and more elaborate report.

Mr. Tice: I hold in my hand a communication addressed to this Society, from Dr. H. Schroder, of Bloomington, which I will read. It relates to this subject of the grape rot, and proposing the remedy.

The letter was read.

Mr. Husmann: I move that the subject of this letter be debated. Carried.

Mr. Husmann: As this method, which Dr. Schroder recommends, may be new to many of the gentlemen here, I will state that that method was tried in our vineyards at Hermann, as long ago as eight and ten years, and we never reaped any beneficial results from it. I have seen it tried and have tried it myself, and it does no good. Then, only think of the immense labor which it imposes! Why should we persist in setting out varieties that impose upon us such labor, even supposing that it met the difficulty, which it does not? Why, I say, persist in raising varieties which require this attention, when we have varieties equally good, and even better, that need no such attention? Why persevere in planting these varieties? It is working against nature. Now, just look at this matter a little. The Doctor says the three year is the best crop, and he recommends the renewing of the vineyards. Are we prepared, in this day when labor is so hard to get—are we prepared to go into this extra labor of planting new vineyards every year? I do not think we are willing to do it. What is there in the Catawba to recommend it? The people say it makes good wine. So it does; and there are other varieties that make good wine and more of it. Why not plant them? Why go to this unnecessary labor, allowing that it would be a success, which I have shown it would

not be? I do not think this Society is prepared to adopt the suggestions made in that letter. It will not pay.

Dr. Hull: With reference to this method of growing the Catawba, I have had some experience. I had occasion to extend my vineyard, and laid down canes for that purpose. It so happened that the grapes upon these vines were the first to rot. I do not think the paper contains anything original or meritorious. This subject came up at Bloomington. I did not wish to say anything against it there, and did not. I am glad it has come up here in the manner that it has. I hope we shall not indorse the sentiments that the letter contains.

Mr. Husmann: I have a few additional remarks to make. The Doctor says that the three year is the best crop; that young vines bear better than older ones. Now, we have had finer crops of the Virginia seedling at twelve and fifteen years old, than we ever had when the vines were young. It is also true of other varieties. The Concords never bear so well the first season as afterwards. The health and strength of the vine increases in vigor and productiveness, instead of deteriorating.

No action was taken with regard to the letter.

The report on apples was read.

Mr. Allen, in the absence of the chairman, Dr. Edwards, read the report.

The report not appearing in the desired form, was recommitted, and the committee required to report at a future time.

Adjourned.

AFTERNOON SESSION.

JANUARY 11, 2 o'clock, P. M.

President in the chair.

Dr. Spaulding proposed the following resolution:

Disclaimer.

The Missouri State Horticultural Society, although formally accepting and publishing the various essays and communications read before the Society, holds itself wholly irresponsible for the opinions, theories and criticisms therein contained, except when indorsed by special resolution of the Society, and remarked as follows: There are more or less sentiments contained in essays and communications read here, to which members here would take exception, but there is no time to discuss these points; they are passed by without discussion, printed, and, with this *quasi* indorsement, sent forth to the public. The individual himself should be responsible for these sentiments, but I, for one, am not willing that they should pass as the sentiments of the Society.

Mr. Muir briefly advocated the resolution.

Mr. Colman: I fully concur in the importance of adopting this resolution. The only fault I have to find with it is that it does not go far

enough. A good many of us get up here and make statements unadvisedly, which people in the country gulp down as law and gospel, and I think that the resolution, in addition to containing what it does contain, ought to be enlarged, so as to say, any individual opinions expressed by any of the members, unless indorsed by a majority of the members. There are a great many of us here who have theories, and we get up and express these theories, not only in this Society, but in the St. Louis Horticultural Society, and they are theories only, and that is one reason why I made the remark recently before the St. Louis Society, that we ought to be very careful what statements we make, because they are read by the great public, and published as part of our proceedings; and I will move to amend this resolution, so that it shall likewise contain a provision against such a thing. I move to amend, so as to say, "oral discussions of the several members." I think that it ought to be done, though I don't know that it will effect the desired object, though it is just as important to have that in as it is essays and communications.

Mr. Peabody: I second the amendment. It seems to me that this thing is wholly unnecessary. When people find the proceedings of this Society in the papers, I suppose they read them the same as they do the proceedings in Congress—if they don't agree with it they let it go. It is so understood, I believe, in the Society. I don't understand that whatever a man says here, or whatever he writes, is to be taken as the expression of the Society. I don't think the people so understand it. I suppose it is a free country, and that people who read our proceedings will understand that we conduct ourselves freely in our meetings, and express our opinions freely. I shall vote against it.

Mr. Kelly: I am glad Dr. Spaulding introduced that resolution. I think if we allow an essay to be printed, we allow it a kind of indorsement. I don't think the same thing applies to oral discussions.

Dr. Spaulding: My object in introducing the resolution as it stands, was for the purpose of disclaiming the adoption of these essays and communications which are offered here, and which we have no time to discuss or dispute at all. In relation to oral discussions, if anything is said that another man don't agree with, he gets up and disputes it, and the poison and the antidote go forth together.

Mr. Mertfeldt: I arise to indorse the sentiments of Mr. Peabody. I believe if it is the habit of offering a premium for essays, and a premium is awarded, that would amount to an indorsement of the essay, but not as essays are read here.

Mr. Saxton: I am opposed to the amendment of Mr. Colman, and to the whole thing; it amounts to this: we come together here, spend the whole time in having a good talk, invite these essays to be read here, and then turn round and tell the public that we do not indorse them.

Dr. Clagett: This is an important point. I simply express my own individual opinion on that point, which is, that essays that are invited

to be read here on various subjects, should be considered by the Society—should be discussed, and whatever the essay may have said, the discussion following would give the sense of this Society; and if the Society fails to ventilate an essay offered here, or a report, it is their own fault. I think this is superfluous. If they publish an essay without the comments which should go with it, they are not doing their duty.

Mr. Colman: I withdraw my amendment.

Mr. Kelly: If Dr. Spaulding's resolution is to pass, I would make an amendment, that the word "except," and all after it, shall be stricken out. We are all well aware that nineteen-twentieths of the members would hesitate to vote against the indorsement of an essay, after an invitation had been given to a member to prepare one and read it.

Dr. Spaulding: I accept the amendment of Mr. Kelly. It has been objected to this resolution for the reason that it is condemnatory of the essays. I don't think it will have any such effect in the public mind. My object is to prevent the effect on the public mind of certain things that are published in the proceedings of this Society, and thereby obtain a *quasi* indorsement. I have formerly been ruled out when I objected to an essay.

The President: I think you are mistaken, Doctor.

Dr. Spaulding: I recollect the instances perfectly well. If this resolution is passed, and if this is published with the proceedings, it will prevent the appearance of this indorsement. I shall feel compelled, unless something of this kind is done, to move to lay on the table or reject essays or communications, which I do not like to do. You know very well that an essay prepared for a certain purpose, read before this body and published, carries a good deal more weight than what comes out in a discussion.

Mr. Peabody: The reason that I object to this resolution is, because it is entirely superfluous. It may seem to the reader that it is designed at something in particular. I presume that is not the purpose of Dr. Spaulding. I presume it is general in its aims, but it is superfluous. It is understood in all bodies that these essays, whether written or verbal, are not to be indorsed by the Society, unless they come in for regular action.

Mr. Colman: I dislike to consume any more time on this subject, but I am one of those men that when I believe I am right, *think I am so.* I am willing to fight it through. I try to be right, and then maintain that right. I have had considerable more experience about these matters than a good many of you perhaps have. I know I have lost a great many subscribers to my paper by having certain correspondents, over their own signatures, giving certain directions for cultivating certain crops, which proved to be injurious. I know that a large majority of the public take down as law and gospel everything they see printed in an agricultural or horticultual journal, and particularly everything they see contained in the proceedings of a State

Horticultural Society like this. Now, this resolution can do no harm; it merely says that every tub shall stand on its own bottom, and if an essayist states certain opinions, that he shall be held responsible for those opinions, and that the Society shall not father them. I say that is right.

Dr. Clagett: I have noticed here with extreme regret that gentlemen have been appointed and selected to write essays to be read here; they have read them, supposing that was to open the discussion upon some particular subject, in which members of the Society were interested, and that, after the consideration of one man's ideas, they would ventilate the subject and express their opinions. These essays have been read, and passed to the Committee on Publication without comment. I make up my mind that I have read my last essay here. Why? Because I wanted information on a subject, in regard to which I gave certain opinions here, and wanted to know what other men thought. I heard nothing. Now if this Society hears an essay read upon any particular subject, and neglects to correct any errors therein contained, they are responsible for it. I read an essay here, and I invited any one who found anything in the book of God's law contrary thereto, to get up and assert it. No man dared to call it in question. The consequence is that the public have a right to think that this Society indorsed the sentiments therein contained, and if they didn't call it in question, it is their own fault.

A division was called for on the adoption of the resolution, and the resolution carried.

The report of the Committee on Apples was called for.

Dr. Dyer: I move that the committee only read those they have reported favorably upon.

President: That will be taken as the sense of the Society, unless objection is made.

The report of the Committee on Apples was then read by the Secretary.

Dr. Hull: I move that a committee of five be appointed upon each fruit, to prepare lists for recommendation or presentation to the American Pomological Society, as adapted to cultivation in Missouri.

Dr. Clagett: I second that motion.

Question put, and motion carried.

Mr. ——: I will submit whether or not the resolution ought not to go a little further, and direct that these committees make their report in time to be presented to the American Pomological Committee here next fall.

At the request of the President, Mr. Earle took the chair.

Mr. Peabody: I would like to know whether the reports that have already been presented and adopted by the Society are included in that motion?

Dr. Spaulding: I move that all our action in regard to the fruit lists be reconsidered and placed in the hands of the committees yet to be

appointed, that they may make the lists in accordance with the regulations of the American Pomological Society.

Mr. Muir: The different committees are required to refer to James Vick, (?) of Rochester, for catalogues prepared by the American Pomological Society.

R. S. Elliott: I don't think it is necessary to reconsider all action that has been taken. Many members have gone home, supposing the action of the Society on certain lists final, and it would be unfair to reconsider that action now.

Dr. Spaulding: I withdraw my motion to reconsider, with the understanding that what the Society has done is not to be taken as conclusive by the committees to be appointed.

Dr. Beale: I wish to propose a resolution which has been passed by the Ohio and Illinois State Horticultural Societies, and ask that the Secretary may read it.

The Secretary then read the following resolutions:

Resolved, That we feel deeply interested in the great Department of Agriculture connected with our Federal Government; that we desire its entire success, and believe it destined to contribute immensely to the advancement of agriculture in the country; that we earnestly entreat the President of the United States to appoint a competent man to be the head of the Department of Agriculture, the incompetency of the present incumbent being a source of general remark and complaint from the intelligent agriculturists of all parts of our extended country.

Resolved, That in the opinion of this Convention, a change in the head of the Agricultural Department is imperatively needed for the best interests of the producing classes of the country, and the President of the United States is most respectfully petitioned to listen to the complaints embodied in the foregoing resolutions.

Dr. Spaulding: I second that resolution. I wish only to add to it, that we reiterate the resolutions of the Ohio and Illinois State Horticultural Societies. From reports I have had from reliable men, the subject of these resolutions is a perfect lick-spittle and toady to every member of Congress.

Dr. Hull: I object to him because he has $100,000 in his hands for the purpose of forwarding agriculture and horticulture, and I am informed that he has found a good deal of difficulty in expending the money in his hands. Now, I am informed that Townsend Glover has prepared a very elaborate work on insects, of each of which he has made a copper plate engraving. On the other hand he has all the birds, and arranged in a little box under them, the contents of their craws, showing what they eat. I am told it is the best thing yet arranged. This is a point on which we have, thus far, entirely overlooked our interests. If entomologists are correct, we have seven thousand five hundred insects of the cannibal species in the United States that are not noxious. It is also true, that in cultivation, we

cultivate by the hundred million the noxious insects and destroy the cannibals. Now, with a work of that kind at hand, we could easily know our friends among the insects, cater to them, and increase them; at all events, it would give us correct information. In view of all these facts, Newton cannot see that that work of Glover's should be published, though it can be done for ten thousand dollars, and has cost a life-time in its preparation.

Mr. Mertfeldt: I have been informed in regard to this one hundred thousand dollars, that it was impossible to get any account for any of it. Now, when a servant of the people refuses to give an account of his stewardship, he ought to be removed. But the difficulty is to get at him. He takes every member of Congress by the hand, and says: "I have a few packages of this seed (or that), saved *expressly* for you," etc., when he has it by the cart load, and in that way endeavors to retain his position.

Mr. Jordan: I am very glad this thing has come up for ventilation. I have made application, not only by letter, but by friends going to Washington, to see if I couldn't get something in the shape of a report, or seeds, or plants; but parties tell me, from the department, that Newton says these packages must first be sent to Congressmen.

Mr. Colman: I move to amend the resolutions, by adding that a committee be appointed to present these resolutions to the President. That position is one of the most important in the Government. I think there is no State department more important, and that it should be one of the departments of State. None of us will deny that it is not thus honored at the present time. I contend that there should be a Secretary of Agriculture as well as a Secretary of State, or a Secretary of War, or a Secretary of the Interior, and that he should receive the same pay and honors that any of the Secretaries do. The interests of this great nation are dependent upon having a wise man at the head of that bureau. Efforts have been made for a long time to displace the present incumbent. I have used my influence for two years past to that end, but we have not been successful in moving him at all. He is one of those flatterers who follow up the President and members of Congress, and fawn upon them, and bows and scrapes at them, and retain their places, and I don't know how we are going to speak in tones loud enough to reach the President. That is an important question for us to consider. The President ought to know that there is a voice springing up from the whole country. Our late lamented President remained deaf to it, and our present President is deaf thus far. I don't know how we are going to do it, unless we appoint committees to go and have a personal interview with the President himself.

Mr. Newton is unable to write out any of his reports. He is unable to do any of his own writing. He does nothing but court and flatter these different members of Congress, and keep in the good graces of the President. The mere passing of these resolutions is but as the

idle wind. We need to speak in tones that will be heard. We have many men fitted for that position. I would name, as one among the first, Dr. Warder, of Cincinnati. [Cheers.] Mr. Newton is a mere Philadelphia huckster. I hope the amendment to deliver this resolution in person will pass, or let us send it to Mr. Hogan, the Member of Congress from this district, and ask him to see that it is delivered to the President. All other horticultural societies should do the same thing.

Dr. Morse: I believe that I am in favor of the amendment offered by the gentleman who has last spoken, or to this degree, that some person connected with this Society should send these resolutions, if they are passed, to Washington. The State Board of Agriculture, of which I have the honor to be Secretary, a short time ago had this subject before them, and passed resolutions adopting or indorsing the resolutions of the Ohio Pomological Society, and directed the Secretary to transmit copies of this action of the Board to the members of Congress from Missouri. If this Society passes such resolutions, as I hope they will, they should be sent there either by a committee or sent to the Representatives in Congress. I could not advocate sending them to Mr. Hogan alone.

Mr. Elliot: This is a State Society, and it would be scarcely proper for this Society to send its resolutions to any particular member of Congress.

Mr. Colman: The reason I mention Mr. Hogan's name was because he happened to be the member of Congress from this district. I accept, with a hearty good will, the propriety of sending these resolutions to all the members of Congress from this State.

Dr. Spaulding: I only want to state that I happened to be present in Ohio when these resolutions were passed there. It was there stated that if they sent them to members of Congress, Newton was so much of a toady that if he got wind of anything of that sort he would prevent its reaching the President; that unless some one handed them to the President personally, he would, by his influence on the clerks at the President's house, intercept them. Now, the resolutions, as passed by the Ohio Society, were placed in the hands of Dr. Warder, who was going to Washington himself, and was instructed to put them into the President's hands himself. I think it would be well to send these resolutions to Dr. Warder.

Mr. Jewett: I think that it ought to be kept out of the hands of the members of Congress. The appointment was given to Mr. Newton by a committee. It was a mere matter of recommendation of a committee, of which Mr. Sumner was chairman. I believe Newton's influence is such there in Washington that probably the President will take very little action in the matter, unless it is brought to his notice through the agricultural societies. I have no doubt but the committee on the grounds there at Washington who had the selection in this matter, the Committee of the Interior, will probably have the say. I

don't think the President will investigate the matter at all, but leave the whole thing to the committee. As I understand it, these matters are regulated by a committee of Congress. For that reason it is very important that the representation should be made to that committee, and by men strictly connected with agricultural and horticultural interests, and not by any one connected with Congress.

The President resumed the chair.

Mr. Mertfeldt: The remarks of the gentleman last up met with my approval, and I will add that the State of Missouri, represented here by the Horticultural Society from all parts of the State, and the Board of Agriculture of the State appoint a gentleman, who shall act as a committee, and that Dr. Warder be left out of sight in this matter. I find, to my gratification, that Dr. Warder has as many friends here as in Illinois or anywhere else, who would like to see him the successor of Mr. Newton. Now, if the President of this Society, through his Recording Secretary, will put himself in correspondence with the Illinois, Iowa, Wisconsin, Indiana and Ohio societies, I have no doubt that a delegation can be got up, one from each State, and sent to Washington, that will accomplish the desired result.

Mr. Earle: When this matter was before our Illinois Society, Dr. Warder's name was mentioned in connection with this matter, and, with two others, I had the pleasure of talking with Dr. Warder on that subject, previous to our action, and Dr. Warder declined. He said that under no circumstances could he ever consent to take the head of that department.

The President: In my address to you the other day, I referred to the department, and recommended that some action be taken in regard to a change in the head of the department, and not for any trivial or light cause. I knew Newton had utterly failed—had failed to meet the expectations or elicit the coöperation of the leading agriculturists of the country—and believing it, as I do believe it, our duty to take some steps towards his removal, and that it should be done in the manner that will reach the appointing power most directly, I said what I did. The manner in which it shall be done must be determined by the wisdom of this meeting at this time. I want to confirm what Mr. Earle has just said in regard to Dr. Warder. More than a year ago, in a conference upon this subject, it was said to him that we would be glad that he should be at the head of that department. He declined in the most positive manner, and said he would not accept it if it was tendered to him. I hope these resolutions will be adopted, and take such course as to reach the appointing power in the most direct and efficient manner.

The vote was then taken on Mr. Colman's amendment, and the amendment was sustained.

Mr. Elliott: It would be well enough if this committee could, in some way, bring out the idea that the department of agriculture ought to be an independent department, equal to any other in the

Government. I know the French Government has a department of agriculture, and I think it would be well if, in that respect, we should imitate them.

The President: With the consent of the house, that may be embraced in the resolutions.

The resolution, as amended, was adopted.

Mr. Colman: I have understood from somebody that our very modest friend, Mr. Carew Sanders, has a report on flowers in his pocket. I would like to apply a cork-screw to it and draw it out.

Mr. Sanders made report as follows:

The past season has been a favorable one for flowers and floriculturists; for, though the spring and summer was a remarkably wet one, which, in less sunny and more moderate climes, causes flowering plants generally to become gross and run to foliage, and less to flower, in our favored climate, the great majority of flowers, though growing much more than usual, are equally profuse in bloom, and consequently are as gay or gayer in flower and foliage both than in a very dry season. The exceptions are a few kinds that bloom more freely in the hotest suns and dryest atmospheres; such are the Petunia, Portulacias, Thloxy, Lantemas, Glaviolus, Tigridia and others—these and such as do likewise are invaluable in dry seasons in furnishing the chief attraction, and should be cherished accordingly. And still it is true that the greatest number of varieties that we have for the decoration of our gardens grow and flourish the best, and yield their blossoms in equal profusion and beauty in more moist seasons. But as there are six out of seven of our summers that are dry rather than otherwise, it becomes our duty to pay more attention to those kinds that succeed well in such seasons. Fortunately, we have a good list to select from even of these. Many varieties of tropical and semi-tropical plants from our own Continent, especially the southern part of it, from China, Japan and India, furnish plants admirably adapted to our summers, and serve as bedders; but these have to be taken up and protected in the green-house during winter; and this furnishes work and trade to the professional florist, whose business, in all civilized communities, affords remuneration and employment for many pairs of hands and minds.

This business here in St. Louis was sadly interrupted at the breaking out of the late great civil war, but it was not extinguished; indeed, for the last year or two, it has rapidly revived, and your committee are informed that the last season was one of the most prosperous ones our florists have known, and this before the war had entirely closed. What may we not expect, now that the war is over, that enterprise is springing up on every hand, and Missouri, disenthralled from slavery, is inviting and receiving immense accessions to her population of the best and most intelligent class of emigrants, from all parts of the world, which must result in not only opening up her mines and farms and creating manufactures, but also in building up her towns and

cities, and increasing the wealth of her mercantile and manufacturing, as well as producing population.

It is greatly to be hoped, in fact, it is certain, that horticulture will receive a share and be a partaker in the gigantic marches of improvement already foreshadowed as the manifest destiny of our great and noble Mississippi Valley. That vineyards and orchards on a gigantic scale will be projected and carried out, until ours becomes the fruit garden of the world. We ask and pray that the refining, elevating, humanizing art of floriculture and landscape adornment may receive a larger share of attention than ever before, both for the benefit and pleasure to be derived from it by all classes and conditions of men. Yet, notwithstanding the improvement in floriculture and the increased interest manifested in the charming pursuit all around us, your committee feel constrained to say, which they do with reluctance and extreme regret, that Missouri, and especially the great and wealthy city of St. Louis, is far, very far, behind all other cities on the Continent, of its size, and, indeed, behind many other towns and cities having less than a tithe of the wealth and population that St. Louis has, whether in its public grounds, its private collections, or in its commercial establishments, whether it relates to floriculture, arboriculture, or landscape gardening.

"Immeasurably behind, not to be mentioned in the same connection" with Philadelphia or Boston, or even Chicago and Cincinnati, is the language of a gentleman, thoroughly capable of judging, who has visited three of the above named cities the past season. Next fall the "National Pomological Society" of the United States is to meet here, and St. Louis will aim to revive her old magnificent exhibition of the Agricultural and Mechanical Association, the pride and boast of former days; and she will succeed in all that relates to the agriculture and the mechanic arts. Possibly, even Pomona may be well represented, if the season is propitious. But where will Flora stand? In the background, we fear.

These two associations (especially the former) will bring the leading horticulturists—some of whom are also the best florists in the country—here, and they will expect to see something commensurate with the tall talk they have been in the habit of hearing from St. Louis, and with their knowledge of the wealth of its inhabitants, and favorable climate; and your committee ventures to predict that the gardeners and horticulturists of St. Louis will blush for shame at the meagre display of their branch of this fine art they will be able to show these gentlemen; and what is worse, at the extreme paucity of examples of the higher branches of gardening to be seen anywhere in the city and its environs. In all wealthy communities there are always some individuals who take a liking to gardening, who prefer to enjoy their means by erecting green-houses and conservatories, and securing and encouraging skilled gardeners; and who share with the latter in a very laudable pride to possess fine collections of plants, fine specimens

of skill in growing them, and so on. St. Louis, from her thousands of wealthy citizens, should have scores of such men. But where are they? Where is there a good collection of plants—where is there a single dozen of well grown specimens to be found, such as would take a premium even at Cincinnati?

Where is there a good set of forcing houses and cold graperies, where exotic grapes and other fruits might be seen and tested by the side of our native grapes? Where is the commercial florist, who has the means, or if he has the means, has the spirit or taste to do or dare any of the above things? Where are our Sargents and our Hunnewells among wealthy amatuers; where are our Hoveys, our Buists, our Parsons, our Hendersons among florists and practical gardeners? Where are our Fox Meadows and Chorlhoins among nursery men? To all these questions echo answers—where?

The few such men and places and collections St. Louis once had are lost and gone. The few good gardeners that once lived here are gone to fields and pastures new, and there is no field or inducement for others to come. Your committee cannot point to a single example (with one exception, that of Henry Shaw) of a perfect place where all the appointments of a modern first class garden, including greenhouses, graperies, forcing-houses and a well laid out flower garden and pleasure ground can be found. And Mr. Shaw's—fine as it is in many respecis, viz: in that of stone walls, entrance gates, and buildings generally—is far behind what it pretends and aims to be, viz: a botanic garden.

Your committee is well aware that all these things are entirely matters of choice, as far as individuals of a community are concerned —that no one is forced to spend his money in fine gardens and greenhouses and the support of skillful gardeners unless he has a mind to; but then it is acknowledged all over Christendom that the taste and refinement, and even the intelligence of a community, are, to a great extent, measured by this standard. St. Louis can boast of as fine specimens of architecture—her citizens are indeed lavish in this respect. She has men of the highest skill in all other professions; why can't she have her fine gardens and parks and nurseries? that is, why don't she? And the only answer we can give is, because her citizens, as a whole, are wofully lacking in taste in that culture and refinement which finds its expression in that purest, sweetest and holiest enjoyment—the cultivation of flowers.

But let us descend to the consideration of a lower grade of gardening—that is, with men of smaller means. St. Louis seems to be singularly deficient in the number of smaller amateurs, (if we may so call them) her less wealthy merchants, her mechanics and artisans. In other cities, many thousands of dollars are annually expended in fixing up their little yards and gardens with flowers, shrubs and evergreens. Look around the suburbs of Cincinnati and Philadelphia for this; then look around St. Louis, and see the difference. Order,

neatness, warmth, comfort, beauty, loveliness expresses the one, while nakedness and poverty express the other. And yet it is not poverty, but simply lack of taste and love for the beautiful.

We have in our mind's eye a few individuals of the other sort here, one who has a city lot of 75 by 100 feet or so, who not only grows cherries, plums, peaches, gooseberries, in abundance, and some vegetables, but also finds room for a little grass plot and many choice flowers, making a little paradise of his city lot, with honeysuckles and roses climbing over and covering his porch, and always some flowers in his room. Another, a mechanic, with his half-acre garden, who amuses himself by raising seedling strawberries and grapes—a thorough devotee to the pursuit. Suppose we had only 500 such men around St. Louis, what a different aspect the whole place would present. But suppose we were to imagine every individual imbued with a love for flowers, fruit and trees, and would cultivate them to the best of his means and ability; what a little paradise on earth our homes would be. It does not necessarily require great wealth or means to have a tasteful garden, to have flowers in the window, and around the house, nor even to excel in the cultivation of some certain choice flowers and fruits.

The poor Spitelfields weavers of England are famous for their skill in raising the finest tulips, and the Lancashire colliers can't be beat in fine gooseberries by the most scientific and skillful gardeners England can produce.

While mechanics and artizans take up as a hobby and for the love of the thing, and excel in the cultivation of many florist's flowers, such as the Auricula, the Anemone, Raunculus, Pansy, Carnative, and such humble and lovely, yet beautiful flowers; and have their flower shows, awarding small premiums and certificates of merit, creating emulation and rivalry of the most harmless, yet amusing and instructive kind. When will all classes of the population of this country emulate the example of this noble and intelligent class of men? God speed the day, is the wish of your committee.

Then again, as to public parks. While other cities are exhibiting most commendable enterprise, in fact, coming right up to the true spirit of the age, in providing breathing places for their crowded populations, as well as setting examples of the high art, serving in part as botanic gardens to a portion, and as pleasure grounds and public resorts to others; where all are joint owners, and where the poorest can enjoy the privilege and advantages flowing therefrom, as well as the rich—St. Louis is absolutely doing nothing, or next to it, but standing with folded hands, and letting all other cities pass her by in this great work of reform. Two years ago, the citizens voted down a golden opportunity to have a really fine field of land for a park, and they would do the same again to-day, were it put to a vote; such is the narrow-minded and sordid view taken of this subject by the great majority of our dollar-and-dime population.

During the past summer, your city fathers paid a visit to most of the large cities East of us, to see, of course, in what respect they are ahead of us, and to keep posted as to what they had to do to keep up with the times. They had the good sense to invite your able superintendent of Lafayette Park to accompany them, and he went. Of course, his attention was directed mainly to their public parks and gardens, and one thing that struck him was, that the grounds around all the public institutions were well laid out and kept, many of them exhibiting master-pieces in the art of gardening. It is so the world over, the grounds around public buildings, such as academies, asylums, houses of refuge, hospitals, etc., are all well and tastefully laid out and planted. How is it around the public buildings of St. Louis, whether belonging to the city or the county? And yet, gardening is part of the best means to be employed to restore the insane, reform the drunkard, restrain the vagrant and thief, with lessons of usefulness and instruction for all.

But while your City Council were eager and lynx-eyed enough in examining into the fire departments, manufactories, jails, water works, etc., not one of them could be induced to examine into and admire a fine specimen of landscape or flower gardening, or a rare and beautiful tree, or a choice collection of exotics, or a fine example of garden architecture. But when brought into such places, the first and principal remark they would make was, "its a long way to walk," and soon be looking round to see where they could break for the nearest bar-room.

What can St. Louis expect from such a set of officers and such a constituency, in the way of public adornment of parks and pleasure grounds, and plantations around her public buildings.

Your committee fear you will be inclined to charge them with dwelling too much on local considerations, seeing that this is a State Society. But if the people of St. Louis do not set the example, both by their wealth and taste, in their individual and corporate capacity, what can be expected of the people of the State and surrounding country?

Recurring again to the fact that the coming season will be a good test of what St. Louis florists can do, that is, what they should do, and what will be expected of them—namely, that they do the very best they can, and avoid as far as possible the stigma that must attach to St. Louis, for being so far behind the age in this respect, your committee regret to have to remark, that among the horticulturists that are here there does not appear to exist that harmony and good feeling that should exist among brethren and co-workers in such an humanizing and beautiful pursuit. Anything like caste or clannishness, or feelings of race or creed, should not be allowed a place among horticulturists. Nothing but a generous spirit of rivalry and emulation should obtain.

And yet, a large portion of our professional brethren have always

stood aloof from joining us, and from assisting and working with us, in such a way as to bring out all the strength that St. Louis might do at her exhibitions.

Many of the professional florists of this city, (indeed the greater part of them) are Germans, who, your committee regret to say, exhibit a narrow and selfish spirit in these respects, and we fear will continue to do so, unless a more catholic and generous feeling than has hitherto done should grow up in their breasts.

We are informed that they have a "German Horticultural Society," from which all but Germans are excluded; their proceedings are conducted in the German language, and published only in the German papers; and, in fact, the whole thing made as exclusively German as possible.

Your committee feel no such exclusiveness towards them. We would gladly have them partake in our discussions, and exhibit their products at our meetings, and compete for our premiums, and thus advertise themselves and their business, and benefit the public and themselves at the same time, as well as help to sustain the reputation of St. Louis in a floricultural point of view.

We are happy to say that there a few prominent and noble exceptions to the above, such as that of Mr. Henry Michel, who has always exhibited a liberal public spirit, by showing his fine products, and working cordially and earnestly for the general good of the whole cause. Your committee have only further to say on this subject, that if this Society, or any part of it, can do anything to bring about a better state of feeling between gardeners and florists, of all tongues, they would be happy to see it done.

Your committee would close by saying, if it has seemed to the Society that they have dwelled so much on one locality, that the same principles of taste and feeling should govern all parts of the country alike, that every city and town and farm house should exhibit a taste and desire to have and to hold the pleasures that flowers and gardens afford, each commensurate with the means at command.

All of which is respectfully submitted.

CAREW SANDERS, *Chairman.*

Mr. Elliott was called upon for a speech, and spoke substantially as follows:

I don't think I ought to be expected to make a speech after what I have done to-day. This morning I went to my office, and conducted business there; came here and conducted business here; went down into the Wine Committee room and conducted business there; went on 'Change and spoke at the railrond meeting there; went back to my office to business again; went on a private call concerning my family a long distance down town, to see what was going on there, and am back here again; in the meantime having dined with a friend, and drank two bottles of wine—I mean I and my friend drank two bottles

of wine, and I believe he had his full share. Speaking of wine, the first sample of wine we had down stairs, made from the Hartford Prolific, was infinitely superior to the wine we had for dinner, at two dollars a bottle, imported wine. At that price it would be sixteen dollars a gallon, and is not to be compared, for body or flavor, or pleasantness to the palate, to that sample from the Hartford Prolific. I have sometimes doubted the capacity of this region for producing wines. I now say, since tasting the wine from the Hartford Prolific, that it is not necessary for us to ever import a gallon of foreign wine, except as mere curiosity.

I wish to say, in connection with what we have been doing this afternoon about the Agricultural Bureau, that, modest as may be this Society, and small as may be our attendance here to-day, yet, occupying the position we do, right here in the heart of the unbroken American Union [cheers], we have a right to talk to these men at Washington; and if they don't suit us, we have a right to tell them so.

This department of agriculture ought to be equal to the Department of the Interior, of the Treasury, of the State, and I don't know but I ought to say that it ought to be equal to them altogether. I tell you that if the Secretary of the Treasury wants to pay this three billion dollars of debt, he had better be getting up a better department of agricultnre, and keep the farmers in good humor. If we intend to preserve our good faith, as a government, we must attend to the farming and agricultural interests of this country. I am glad that this Society is speaking ont in regard to this minister of agriculture.

The Committee on Orchards was called on to report.

Dr. Hull: It was expected that the committee should visit the orchards. I regret very much that we have not been able to come together and visit, personally, the grounds of some of our prominent members. I recollect last year a gentleman came into the room with the assertion that he had for ten or twelve years succeeded in growing the Beurre Bosc on quince stock. I was in hopes to ascertain, by personal examination, whether that was the case. I have spent but two days in the orchards, and these at home, endeavoring to bring together the facts I have collected; but finding it too laborious, I have confined my paper to two or three of our insect enemies and friends, which I will read.

Dr. Hull then read to the Society the following essay:

A FEW OF OUR INSECT ENEMIES AND FRIENDS.

Woolly aphis (aphis lanigera), or American blight, as it called in England.

This insect, though well known, appears not to have received that attention which his destructive habits demand. This is one of the worst enemies against which our apple trees have to contend.

It is much more common everywhere in our region than is generally supposed. It is an insect whose food is obtained by suction. By

means of their sharp beaks they puncture the bark of the branches and roots, and, when in sufficient numbers, completely exhaust the parts of sap, causing large patches of dead bark.

The insertion of their beaks into the bark also causes a deviation of the sap from its proper channel, resulting in an increased development of the wood, in the form of warty excrescences, frequently surrounding the root or branch, thus partially or wholly arresting the circulation.

These insects, during the summer, crawl upon the branches of the trees and are distributed broadcast through the orchard by the force of the winds; but, on the approach of cold weather, they congregate about the roots, where they winter under the cover of the earth, continuing their operations as described.

CODLING MOTH—CARPOCAPSA POMONANA. This insect annually depreciates the money value of the apple crop in neglected orchards from twenty-five to seventy-five per cent., and yet, except by a few persons, its habits appear to be but imperfectly understood. The perfect moth comes forth during the first warm days of May, and soon after deposits its eggs in the calyx or blossom end of young apples and pears. These eggs are soon hatched by the warmth of the sun, when the grubs eat their way into the core, where they remain until they are sufficiently matured to spin their cocoons. This they do during the fall months, under the cover of loose bark, in the crevices of trees, or in other sheltered situations.

Taking the average of years, we assume that one-third of the money value of the apple crop is destroyed by this insect alone. Of the product of some orchards with which we are personally acquainted, we doubt if the net proceeds amount to one-tenth what they might be made to do under judicious treatment. In the best old apple orchard that has fallen under our notice, the codling moth seems to have undisputed sway; so numerous were they that the *larva* might be found snugly enveloped in his winter covering under every third or fourth piece of loose bark, from which they are sure to emerge in the spring perfect insects.

It is only one year since the apple crop in the Alton district was so damaged by the codling moth, that dealers in this fruit neglected the home product, and obtained a portion of their winter supply from Michigan and other sources.

Not a year passes but what more or less damage is done by this insect; even in the season just past, in which the unusual amount of rain has operated as a partial check upon it, the loss admitted by the proprietors of orchards has varied from twenty to fifty per cent. Indeed, we know of only three old orchards of which the above estimate could not be said to justly apply. In all of these the worms were formerly very troublesome.

Two of these orchards were separated from the other parts of the farm, and used as hog pastures. Since thus appropriated we are

assured that the loss by the moth has in no year exceeded two per cent. In the third orchard referred to the rough bark was scraped off the trunks and limbs in the fall, and soap applied as described for the prevention of borers. This process, in connection with fires lighted on one or two warm nights in the month of May, has reduced the rate of loss from say sixty to ten or fifteen per cent.

THE APPLE TREE BORERS. Apple trees are attacked by many of the numerous family of capricorn beetles, the greatest number of which are nocturnal in their habits, and hence generally escape the notice of ordinary observers. In all the orchards that came under our observation, we found trees more or less subjected to their influence. Generally, wherever a wounded trunk or branch presented itself, or whenever the regrafting of branches had been attempted, or trees from other causes had become sickly, the borers were found in such numbers as to cripple and kill them.

REMEDY. Without claiming to know or to offer the best means of destroying these most pernicious insects, we may be excused for mentioning a practice which, if perseveringly applied, will ward off their attacks:

Heat to the boiling point, in a brass or other kettle, a sufficient quantity of thick soft soap, and with a brush apply it while hot to the trunk and parts exposed to the attacks of these beetles. This application should be made in May and again in July.

Two of the apple tree borers alluded to, *saperda bivittata* and *chrysobothris femorata*, when about to undergo their transformation, cut their way out to the bark, under the cover of which, while changing to beetles, are themselves subjected to the attack of an ichneumon or parasitic insect, a description of which I do not recollect to have seen. This parasite is provided with a piercer, one-half to three-fourths of an inch in length, jointed to the under part of the body; with this an opening is made through the bark immediately over the borers, into the body of each of which an egg is deposited; from this egg a small grub is hatched, which eats out all the soft parts, leaving only the skin unconsumed. It then undergoes transformation, when it pushes its head and about one-third of its body into the open air. In this position it changes to a steel-blue color, when those which escape the birds take to the wing.

Some four years since, I became acquainted with the habits of the calosomae; since that time I have frequently taken them in my curculio catcher, while catching curculios, and instead of destroying them with the other insects captured, I place them on trees on which there is a nest of caterpillers, which I always reserve for them. This year they had so increased in numbers that I had not sufficient food for them. Once upon a tree infested by caterpillars, he quickly enters their nests, the inhabitants of which he devours as a greedy morsel. A few days later, if we pay our respects to our insect friend, we find him to present truly aldermanic proportions, and in this con-

dition, having eaten his last insect, he sallies forth in pursuit of other victims, and too often, we fear, himself falls a prey to the rapacity of some insectivorous bird.

There are many persons who advocate the propagation of our insect friends.

In the transactions of the Illinois Agricultural Society of 1859 and 1860, Mr. Walsh says: "If these views be correct, it would seem to follow as a necessary consequence, that one of the most effectual means of controlling noxious insects is to be found in the artificial propagation of such cannibal species as are naturally designed to prey on them. We must fight fire with fire, and use one nail to drive out another. Cats are bred all over the world to prevent rats and mice from becoming unduly numerous; ferrets are bred in Europe for the same purpose, and are found very useful. Every sportsman knows that different breeds of dogs are employed in hunting down and catching various kinds of wild animals."

In all these cases man sets a quadruped to catch a quadruped. There can be no good reason given why he should not also set an insect to catch an insect. The idea of propagating cannibal insects artificially may at first seem startling, but fifteen years ago if any man had proposed the artificial propagation of fish, it would have startled the world just as much. And yet, now-a-days, this is a regular business, not only in France, where it was first invented, but even in the New England States.

Bees and silk worms have been bred artificially for centuries, and the Mexicans raise annually, by a most elaborate process, a million pounds of cochineal, each pound containing, according to an exact calculation of Humboldt's, "seventy thousand distinct insects." Entomologists, too, are in the constant habit of breeding insects of all kinds, partly for the sake of studying their habits, and partly for the sake of becoming acquainted with their transformations. Now, if naturalists do this on a small scale, in the interests of science, there can be no physical reason why it should not be done by others on a large scale, in the interests of agriculture. There can be no physical reason why it should not be just as common to send to the insect breeder for a box of dragon flies, or an ounce of the best ichneumon flies, as it now is to send to the druggist for a pound of Spanish flies or a quarter of an ounce of cochineal.

Let us for a moment turn our attention to the rapid increase of injurious insects, and if possible determine why it is that they are more numerous than formerly. Take the curculio for example. The time was when there were few or none in certain regions of our country. At length a solitary female, following in the path of our improvements, comes, with perhaps a dozen eggs impregnated. These she lays in as many specimens of those fine plums on one of your young trees now coming into bearing. Only a dozen eggs! exclaims the proprietor; what harm can they do? I have one thousand plum trees, which

in two or three years, at a very moderate estimate, ought to produce from two to three thousand bushels of fruit; and how it can be possible that the dozen insects that are to come out of these stung fruits can hurt so large a number of plums, is more than I can comprehend. The next spring our six pairs of curculios are delighted with the rich harvest before them. The young trees are laden with fruit, and the beetles enter upon their labor with a will, commencing about the fifth of May. The six females average not less than fifteen deposits daily in as many plums. This they will continue to do until about the tenth of July, say ninety days; this gives four thousand and fifty grubs, or two thousand and twenty-five pairs; and these, at the same rate of increase, will, the ensuing year, spoil five million four hundred and sixty-seven thousand five hundred plums, or, reckoning five hundred plums to the bushel, would give ten thousand nine hundred and thirty-five bushels.

Here it may be well to observe that in two and one-fourth years from the time that a solitary curculio entered an orchard of plums, that its progeny was equal to the destruction of a much larger amount of fruit than could be grown on one thousand tree. We inquire, then, did not the planting of the orchard furnish the means of this great increase? and do we not multiply certain kinds of insects just in proportion as we increase the means of their supports.

Had this solitary insect flown over the same tract a few years earlier, it would have been impossible to have established a colony of her species, for the simple reason that man had not provided the material necessary for her young.

On the other hand, had a thousand orchards been established instead of one, another year and the products of this greatly increased number of trees would have shared the fate of the former.

Does not the same hold true, in a greater or less degree, of the codling moth, wooly aphis and other noxious insects? Enlarge the field and you multiply the species just in proportion as their means of subsistence is increased. On the other hand, cut down your trees and cease to cultivate, and the much admired balance of nature theory of some is restored. Man has become a savage, the curculio is limited to the wild plums of the forest, the products of our farms and the insects of foreign origin belonging thereto cease to exist on our continent; the wild vegetation of the country becomes reëstablished, and with it the seven thousand five hundred species of cannibal insects indigenous to the United States, again finding themselves in possession of their haunts and means of increase, will take good care that the balance of nature is maintained.

President: The report will take the usual course, unless objection is made.

Dr. Beale: I propose that the Society now appoint a committee, consisting of one from each congressional district, to furnish a list of

fruits to the Pomological Society, and in addition one efficient man to devote to it as much time as shall be necessary. This is an important matter, and he should be such a man as will attend to it. I make that motion.

Dr. Clagett: The committee, in whose hands that matter now is, will report at the commencement of the evening session.

Dr. Beale: I withdraw my motion.

Dr. Spaulding: I wish to call up the report of the committee appointed to visit the botanical garden of Mr. Shaw. I will say, in relation to that report, and our visit there, that Mr. Shaw has set apart a portion of his grounds for a horticultural experimental garden. He feels very deficient in pomological knowledge, and he said he wished the Society would aid him in that matter, in determining the sorts of fruit he should plant for experiment, and supply him with specimens, and information in regard to the proper method of cultivation. His purpose is a most useful one. Mr. Shaw is earnest in his devotion to this work, and all he lacks is experience and knowledge, and he asks the Society to aid him in that matter.

Mr. Elliott: Are we not getting too much machinery, more than we can keep at work?

The Secretary read certain parts of the report of the committee referred to by Dr. Spaulding.

Dr. Spaulding: I wish to suggest a slight change in the phraseology, viz: That a committee be appointed to coöperate with Mr. Shaw.

Dr. Dyer: I move that a committee be appointed to carry out the suggestions made in this report.

Dr. Spaulding: I hope that the general subject of the establishment of an experimental fruit garden will receive some consideration from the members here. I would like to hear their views upon it. It is a very important matter. The grounds of Mr. Shaw, so far as soil is concerned, can be modified for all varieties of fruit. The elevation is hardly sufficient for the culture of the grape, but he is ready to make any preparations that can be made, and he wants an earnest committee to coöperate with him in this matter, and give him such advice as they may think best. He has already taken out the soil to the depth of two and a half feet, dug a wide trench, and paved the bottom of it with flagging, and after incorporating the top and sub-soil together, he has planted his pears. His object is to prevent a long top root. He is ready to try any of these experiments, which are too expensive for most horticulturists, and if he has a good committee to advise him, the means he will expend may be with satisfactory results. I would like to hear the views of some of the members of the Society on these points.

Dr. Clagett: I don't know as we could do better than to appoint a good committee to coöperate with Mr. Shaw in the matter. I think that is about all we have to do on this occasion.

Dr. Hull: I think I heard in the reading of that report, that the

grounds were not probably adapted to certain kinds of fruits; I think cherries were named. I have no doubt but that experiments might be conducted that would show that even cherries might be cultivated on that ground. I suppose that the committee in writing that did so under the supposition that cherries, like peaches, need very high elevation to escape early frosts. It is to a certain extent true, and to a certain extent not true. I do not think that cherry trees planted at that point would fail, with proper under-drainage. So far as the grape is concerned, I cannot see why the grape might not be experimented with, if the gentleman is willing to go to the expense of making every necessary preparation. I look upon this matter as one of the highest importance. This offers one, which, in our State, we have been aiming at as a State Society. It has been a favorite point with some of us to establish an experimental garden. I hope this committee will be appointed.

Mr. Elliott: I move to increase the number of the committee to seven. Amendment accepted.

The Society voted to appoint a committee of seven to carry out the recommendation in the report of the committee.

Dr. Clagett: I wish to say it might be well to know what subject will be taken up this evening.

Dr. Hull: I move that the subject of birds be taken up. Carried.

The Society adjourned until 7 o'clock, P. M.

EVENING SESSION, 7 O'CLOCK.

The President in the chair.

Dr. Hull: For the purpose of opening the bird question, I move that this Society recommend the destruction of the oriole, cat-bird, woodpecker, blue jay and cherry bird. I would except the hairy woodpecker, and also the large woodpecker, standing a foot high.

There are two orioles; I would destroy them both in our region. One suspends its nest, the other builds in the crotch of trees. I am not certain which is the most injurious. I believe it is the Baltimore oriole that suspends his nest. The orchard oriole has some black marks upon it, especially the male. These birds are too expensive in our neighborhood to tolerate. I am, as you are aware, growing plums, cherries and grapes; each of these three fruits are depredated on very largely by these birds. I would not object to feeding them, if that would answer the purpose—that is, if they would eat the fruit that they peck; but the oriole enters my plum tree, always conceals himself, and commences to peck fruit. I do not understand his object, unless it be for the purpose of getting something to drink. It is the same thing with cherries; and, after cherries and plums are out of the way, he is one of the first birds to discover that grapes are beginning to mature. He comes to the vine, always concealing himself, lights on a bunch, and, as in the case of plums and cherries, instead of eating, he com-

mences and pecks all the finer berries, and always the finest bunches. It is not the amount of food he takes, but the berries he destroys. The juice runs out of the berries he pecks and damages the rest of the bunch; then he takes another, and another, and another. In this way a family of seven orioles would be equal to the destruction of half an acre of Concord grapes. This year they depreciated my small stock to the extent of two hundred and fifty gallons of wine in two weeks' time, and spoiled all my Concords for market, except half a dozen boxes. In view of this fact, I am for controlling the bird—at least, holding him in check, so that we can afford to tolerate them. I really feel that it is necessary to take some action in the matter, and it would be very little use for me to station a boy in my vineyard if my neighbors do not help me. It is possible that many persons have not been injured by the oriole, for the reason that this bird migrates very early—so early that a vineyard two weeks behind the ordinary time of ripening would escape altogether; but he will destroy all the early grapes. I think he destroyed all the Delawares. They were all lost in our neighborhood by the oriole and the cat-bird.

The President: How many would you save?

Dr. Hull: I wouldn't like to save any.

Mr. Peabody: Is this bird of any use? Does it destroy any insects?

Dr. Hull: I think a good deal of the feeling in reference to birds is one of sentiment: in other words, we often consider birds our friends, simply because we find insects in their craws. We hear it stated that an oriole must be beneficial, because some one has found one hundred and fifty insects in an oriole's craw. I will venture to say that a very large proportion of them were our insect friends. I know of but two birds that destroy our insect enemies. We have but very few birds that will touch a caterpillar; but when an insect has preyed on an insect, the birds will prey on him and eat him. Our bird fanciers never take this into consideration. I think this is a matter to be inquired into.

Dr. Morse: For the very reason just mentioned by the gentleman, I say we should not jump at conclusions. We do not know enough in regard to the uses of these birds to vote on this subject. It is well worthy of investigation. There is very strong evidence that we could not get along without these birds, on account of their use in destroying insects. It is a serious question whether they do most good or harm—whether fruit growers could not save their crops better by keeping off the birds, than by destroying them. They come in from surrounding farms and neighborhoods, and notwithstanding we should kill every one of them we came across, would we accomplish the objects. Again: one is growing grapes, another man vegetables, and this course, if beneficial to the fruit grower, might be of disadvantage to the farmer. We need more light on this subject. I think it would be unsafe to adopt any such resolution as here proposed. It is well enough to discuss it.

Dr. Clagett: If it is in order, I would move that a committee be appointed to investigate this subject of birds, to report to us such birds as are ascertained to be injurious, and those that are beneficial, at our next meeting. I could not vote understandingly on this question at present. When our attention has been called to this matter, we will come here, at the next meeting, perhaps, better prepared to act understandingly. I think it would be acting prematurely; consequently, I should have to decline voting at all. I move, not to cut off discussion now, that a committee be appointed to investigate this matter and report at our next meeting.

The President: Had you not better postpone your motion for the present?

Dr. Hull: I do not propose to press this matter to a vote. I would like to hear the discussion.

Mr. Mertfeldt: I am surprised that so intelligent a body of horticulturists should find themselves so taken by surprise by a motion of this kind. I believe there is not a man in this house who has not seen the destruction of choice fruit by birds. I will not speak of this particular bird just now, but birds generally. These birds will peck all kinds of fruit, ripe apples even; and if we enter into the cultivation of fruit, it is certainly very discouraging, to say the least, when seven orioles take half an acre of grapes. With regard to the remarks of Dr. Morse, that the destruction of a few of them would not answer, I have this to say: birds are most destructive in their breeding season. If we do not allow them on our trees nor harbor him—if we meet him when he comes, he will try and keep off. They are pretty intelligent; they know how far they may come, and they certainly do stop coming if the bullet reaches them.

Dr. Spaulding: It strikes me there is one other reason why we should wage war against these injurious birds. Their habits induce them to return to the same breeding place, year after year. I don't know that that is universal, but it is very generally so. I have noticed it with the mocking bird. I have known the same birds—I am satisfied it was the same bird—build in the same or an adjoining tree, year after year; I have seen it in this neighborhood, near Lafayette Park. That habit of returning annually would be very much interferred with by Dr. Hull's remedy. Their young would come in the same neighborhood also. It is unfortunate that these beautiful denizens of the forest and orchards are so destructive, that we may be compelled to wage this war against them. I feel a want of knowledge on this subject. I think our Society has rather overlooked this topic.

Mr. Husmann: I hear a very grave charge against the oriole. I am not a friend of the oriole, but I doubt their capacity to swallow half an acre of grapes, unless Catawbas, in a very large season.

Prof. Swallow: I have no good fruit for two or three years, on account of them and other birds, of cherries, blackberries or grapes. The plums they meddle with some considerably, and I have been

thinking that I would wage war on them myself, and should have done so if it had not been for raising a rebellion in my family. Perhaps my family would tolerate me in that, if they found other horticulturists were pursuing the same course, and came to the conclusion that the birds were not so useful after all. In my opinion, they have destroyed much more for me than they ever aided me in protecting. The worst bird, I think, that I have had to contend with is not in the list of the Doctor, viz: the blackbird. The blue-jay ought to be killed at sight. The blackbird has been more destructive than the oriole in my garden. The oriole can't be tolerated. I have not a great many grapes—I haven't half an acre—but I didn't get a good bunch this year, and I never saw a better promise. I didn't get a good bunch last year from any of my varieties. The entire bunch was not disturbed, but grapes in all the bunches were pecked. Certainly, we can't afford to have such destruction.

Mr. Guye: I have heard it stated, and often stated, that these birds, as a general thing, will not harm fruit that has not already been stung by insects. I have marked limbs of cherry trees to find out whether this was so, and I have always found that they have left the fruit so stung by insects.

Dr. Hull: It strikes me that gentlemen with ordinary ingenuity can go into the orchards and destroy more insects, in fifteen minutes' time, than all the birds of the season. Why talk about the benefit which a bird may do, when we can ourselves rid our orchards of our insects—I say, the majority of them. I would not include in this list the little thrip on the grape. As regards all the other insects, except the curculio, I can destroy all in my orchard in half a day, certain.

Mr. Husmann: If that is the case, I would like to hear the Doctor's method.

Dr. Hull: I formerly owned what is called a garden engine. It is a square box, holding fifty gallons, with hose, and attached to the open end of the hose is an ordinary nozzle, one of very small bore. This instrument is sufficient to throw seventy feet horizontally. When I have put, say forty gallons of water into the box, and five or six gallons of soap, I turn the stream into it, and soon make a strong soap suds; I also add tobacco water, and I then put the engine into a wagon, have one man to drive, and another to work the instrument, and direct this stream right and left. This preparation, unlike water, being of a soapy nature, it all goes into spray, and is like a fog. It wets everything; nothing escapes; the back sides of the branches, as well as the sides directly exposed, the upper sides, as well as the under sides, are drenched, and such a commotion as it creates among insects you can hardly imagine, and destroys all except the hard winged fellows. It is very simple, and I always used it with the greatest success. I doubt not I lost $2,000 last year in my orchard from not having one.

Mr. ——: How often do you use it?

Dr. Hull: Twice or thrice a year. In this manner you rid your trees of apple tree borers and the woolly aphis. You soak your trees throughout, and the branches and leaves, and this suds is washed down where the wooly aphis is to be found. Downs & Co., of Seneca Falls, N. Y., manufacture this engine. Price, $45.

Dr. Spaulding: I hope this will not be brought to a vote. I move we pass to the consideration of the next bird on the list, the cat-bird, without a vote.

The President: That is taken to be the sense of the meeting, unless objection is made, and we will next consider the cat-bird.

Mr. Guye: If there is nothing else to be said about a cat-bird, he is a quarrelsome, noisy fellow, that a person who wants a little quiet can't stand.

Mr. Husmann: I think the whole question resolves itself into a very narrow compass. If we only plant grapes enough to supply the birds, we shall get none ourselves; but if we plant enough to supply birds and men too, we shall have grapes. I have about fifteen or twenty cherry trees on the place where I now live, and I found that the birds took the lion's share. On my new place I planted 150, and I think the birds and myself will have some. I believe the benefit from the birds fully counterbalances the damage they do. They have often destroyed the finest bunches on a favorite vine of mine, but when I take into consideration all the benefits we derive from them, I think we ought to be willing to do something in their favor, sooner than to conclude, indiscriminately, to destroy them.

Mr. Votaw: I have been fighting birds for four years. I was told that I didn't plant cherries enough to feed the birds. I have planted about three hundred cherry trees, and I find I have not enough yet. I have planted a little vineyard for my own purposes—the birds ate what didn't rot, and from a quarter of an acre of Concord grapes I didn't get a perfect bunch for the birds. The cat-bird was the bird that destroyed my grapes and also my cherries, and a good many apples, too. I am a foe to the birds, and I am going to kill them, when they are imposing on me.

Dr. Spaulding: There is one fact we don't get into our minds; that is, that this proposition is not to make a general war on birds, but only on a few that are destructive to the finest kinds of fruit. There are many other birds that are destructive of insects, and we propose to nourish and protect them. If the testimony of so close an observer as Dr. Hull is worth anything, we may conclude that this class of birds do not destroy many, if any, of the injurious class of insects.

The question was then put on the cat-bird, and the Society voted to recommend the destruction of the cat-bird.

The President: The next bird for your consideration is the blue-jay.

Mr. Peabody: I am in favor of destroying the blue-jay: it is a disagreeable bird. But I think there is another aspect to this question.

The music of the birds is an offset to some things, and if we are going to indiscriminately destroy them, we should lose that part of the benefit and advantage of them in our gardens. It isn't sentiment wholly; it is a matter that is a benefit, as much so as the taste of the fruits is a benefit. I think we ought to take all these advantages into consideration. Now, I have some very fine, young, thrifty cherry trees, some of the finer varieties; I confess the birds have got the whole of them every year, but then they make very fine music. They come into the trees before I am up in the morning, but they make such a pleasant noise about it that I pardon them, and let them have the cherries. Two years ago I asked Dr. Hull what I should do about it, and he said, "O, don't shoot them; take a lump of dirt and throw it at them."

Mr. Murtfeldt: The birds of song are not natives of this country. I came from the land of the lark and nightingale. It does honor to the hearts of all of us who have taken the part of the birds. I have a leaning that way, but my head tells me that if I want to have the inner man refreshed with the fruit I must try to take care of it. It appeals to our intelligence. We have no hesitation in destroying noxious animals. The shepherd will hunt the wolf. He knows, if he wants to save his flock, he must destroy this animal. If we come to the conclusion that these birds are destructive, that they do more damage than benefit, we ought to destroy them. I think man has a perfect right to do so. I shall not hesitate to record my vote on the side of Dr. Hull. I had a seedling apple tree, and I found there were two dozen very nice red apples on it. I was very anxious to preserve them, but all these apples were pecked and spoiled except two or three, under the tree, and I have no doubt that the blue-jay and cat-bird were the depredators, because they are thicker in my nursery than any other birds.

Dr. Spaulding: I agree with Mr. Peabody that the song of the birds is very delightful, but on this list the cat-bird and jay-bird are the only birds of song. The oriole is nearly mute, the woodpecker screams once in a while, and the cherry bird is mute. These are not the birds he hears singing in the morning; the birds he hears it is not proposed to destroy.

Prof. Swallow: The blue-jay is very destructive on robins' nests and the nests of other birds. It will pitch into a nest and carry off the eggs on its beak.

The Society, by a unanimous vote, recommended the destruction of the blue-jay.

The President: The woodpecker is next in order for discussion.

Dr. Hull: The woodpecker likes fruit, and has a very good taste in that particular—too good for profit. I can't say anything in his favor. It is said that he destroys insects. He destroys insects in his trees, but he destroys our friends. It is a fact that of the borers in our apple trees, not one in ten ever sees daylight, because there is another

insect, which for a long time I supposed was a borer, that destroys them. It is an insect about an inch and a quarter in length. At first sight it resembles the mud wasp. I described this insect in the paper I read this afternoon. On the anterior side of the fore part of the body hangs a piercer, I should say three-fourths of an inch long. By some means or other it knows where the apple tree borers are. The two varieties that I mentioned in my paper, the two most destructive, both come near the surface under the bark, and await their transformation, and while there this insect knows where to find them. He introduces his piercer and begins to work upon it, and forces it into the body of the borer, and puts in an egg, and this egg hatches, and the small grub eats out the soft parts of the borer; it then undergoes transformation, when it pushes its head and about one-third of its body into the open air. While in this position the woodpecker, hopping along on the tree, picks them all up, and it is much more convenient for him to do so than to find the true apple borer, which is concealed under the bark. So far as the fruit eating propensity is concerned, I don't know of anything that he does not eat, excepting the strawberries.

Mr. Guye: I have seen him at these.

Dr. Hull: I know he eats all the other fruits. I have put this question to several gentlemen whom I have visited: "What per centage of loss do you estimate the birds have done you on the apple?" And the answers have been from two to forty per cent. I think I have suffered from the woodpecker, with the aid of the blue-jay, thirty per cent., for they took my good specimens, and, particularly, my early apples. They eat cherries in great abundance, and also plums and peaches. One year I made a careful estimate of my loss in peaches, and it varied but very little from fifteen dollars a day, by woodpeckers especially. I concluded that another year it would well pay me to kill the woodpecker off. I did shoot several hundreds of them, and reduced the rate of loss from fifteen dollars a day down to fifty cents a day; so I am satisfied I can control the woodpecker. They do not migrate.

The Society voted to recommend destroying the woodpecker.

The President: The cherry bird is next on the list.

Dr. Hull: Mr. Peabody remarked that several years since he asked me how I kept away cherry birds. I follow the same method still, though I think I should shoot them now if I had any near neighbors. I am about two miles from any person who grows cherries. They come for breakfast and dinner. I tell my boys to throw dirt at them; the result is that the birds are frightened away, go and light in a tree, and wait a little while and return again; the boys throw dirt at them again, and, finally, being fed, they go off to a distance, where there are cherries—go to neighbor A and then to neighbor B, and keep up the name all day, or a considerable portion of it. I am of the opinion, from what I have seen, that it would be impossible for one man to

plant cheries enough for cherry birds, if they were allowed the limits of the orchard.

Dr. Beal: I would like to have a description of the bird.

Dr. Hull: It is known as the cedar bird and rice bird. They are very good eating—a yellowish bird, with some red on the wings, and a beautiful topnot—about the size of the orchard oriole, and come in flocks.

The Society voted to recommend the destruction of the cherry bird.

The question was then called for upon recommending the destruction of the oriole; was put and carried.

Dr. Spaulding: I wish to add to this list the sap-sucker. It is a bird that does no possible good, but does a great deal of harm. It destroys the trees. I have seen many a tree almost completely girdled by the sap-sucker. It makes a ring right round the tree, and almost entirely girdles it.

Mr. Guye: Will Dr. Hull distinguish this bird from the hairy woodpecker.

Dr. Hull: They are hard to be distinguished. The sap-sucker has a short flat tongue and beak; from the end of it it is hooked. He first strikes the tree with its beak, and by the force of the blow reaches the young deposit of the wood, and with this form of the tongue tears out the new formation of wood out of the hole it has made. He passes round the tree, making these perforations about one-eighth or one-quarter of an inch apart. You have all seen the effects of his operations on your apple trees, and unless you can get rid of him you must abandon growing any of our pines. I believe the information we derive from Northern Illinois, and elsewhere, favors our destroying this bird. The only point is, to distinguish between him and the hairy woodpecker, which you can easily do, after killing the two birds and examining the tongue, and you will soon be able to distinguish them.

The Society, by vote, recommended destroying the sap-sucker.

Mr. Peabody: I would like to ask one question for information. I have heard a great many persons who raise grapes complain that yellow jackets and honey bees came on and eat them. One gentleman took up his bees, because, he said, the bees eat the grapes. It has occurred to me, that, perhaps, the oriole first makes the hole in the skin of the grape, and lets in this insect. I would like to ask if any of these insects really perforate the grape skin.

Mr. Mertfeldt: My father and brother have what is termed the Cedar Ridge vineyard, on the Hudson. They cultivate the Catawba. My brother owns several swarms of bees, and my father informed me that he would have to destroy or sell his bees, for he could not raise his grapes with the bees. It is a well known fact that the bees do disturb this grape.

Mr. Jewett: I had this question under very serious consideration. I have been advised by a good many who have examined the matter, that they do eat grapes, but I have been advised by others that there

was not one word of truth in the charge. Langstroff gives a view of the bee's mouth, and he says it is impossible for bees to break the skin of a grape, and that yellow jackets can do it. He says the bee never touches a sound grape, but when the skin of the grape has been broken, then the bee will take hold of it.

Mr. Votaw: I have tried an experiment this season to see whether bees would eat grapes. I am satisfied they do not. I found a few bees on the grape vines, but a great many more yellow jackets. I have taken twenty or thirty grapes that were not pecked, and set them in my bee bench, and for three days found no bees on them, but, the fourth day, I found a great quantity of yellow jackets came and broke the skins, but, still, after that I never saw a bee on those grapes.

Mr. Muir: This subject has engaged my attention a great deal. I raise both bees and grapes. I watched them very closely, in fact, spent my whole time among them during the month of August, and so did my children, and I never saw a bee injure a whole grape. Towards the latter end of the season the bees worked in the Norton's Virginia, but rely on those that had been injured. The yellow jackets were there by the millions. From the closest observation, my experience is that bees don't injure whole grapes.

Mr. Guye: The same question came up before the Cincinnati Horticultural Society before I was old enough to own a place of my own. It was there asserted that the bees injured the grapes. It was denied. I was staying with an uncle of mine, and he came to me and said, "you have nothing to do; suppose we watch the thing." A neighbor of his had a very large aviary, and he had been accusing these bees with eating up his grapes. We stayed in his arbor watching for most of the time, to see what insects were working on the grapes. We watched the bee, wasp, hornet and yellow jacket. The hornet, yellow jacket and wasp all punctured the grape and eat the grape. They all have jaws strong enough to break woody fibre in making their nests. The bee has nothing of that kind. He has a proboscis with which he sucks up his food. The bee followed the other insects, and sucked the juice after the skin of the grape had been punctured.

Mr. Trebien: I will state that one of my neighbors has a pretty large vineyard, and also six or seven hives of bees, right amongst them, not more than three feet from the grapes. I told him early this spring that it was the opinion of ——— and others, of Cincinnati, that bees injured the grapes, and asked him to watch his bees and see whether they did or not. He made it his business, and that of his children, to watch his bees, and he is very confident that the bees don't injure the grapes at all. He says he didn't see one on the grapes that were on the arbor, and did on those that had fallen off.

Dr. Morse: I have a great many bees at my residence in Jefferson county, and for the last five or six years I have had a great many grapes around my house. My bees are in my door yard, and, also, my

grapes. We never saw any injury by the bees on the grapes. Our grapes are very fine, and, all say, free too. I would very much dislike to have to get rid of my bees to save my grapes.

Dr. Spaulding: I want to ask permission to call attention to a method of destroying birds, recommended by Mr. Hood, here present. His plan is to plant a pole, which shall extend eight or ten feet above the tree, running up through the branches. The branches will conceal a man at the foot of the tree, armed with an axe. The birds, except the blue bird, will first light on the top of this pole, and when they light on the top of the pole, if you strike the pole, they will fall to the ground, and are killed without powder or shot.

Mr. Guye: My father once had me try that method. I could kill woodpeckers, but the light birds, after I had killed a few, would not light on the pole.

Mr. Mertfeldt: I wish that something like the resolution I now propose might have been offered by some one from Missouri:

Resolved, That, in view of the great destruction of fruit and farm crops by birds and insects, the State Horticultural Society recommends to the Legislature of the State the appointment of an entomologist and ornithologist, to give the necessary information to the farmer and fruit grower, to enable them to determine which birds and insects are friends or enemies.

The Society adopted the resolution.

Dr. Spaulding then read the report of the Committee on Fruits exhibited.

Mr. President: The report will take the usual course, unless objection is made.

Adjourned until 9½ A. M., January 12.

FOURTH DAY.

JANUARY 12TH, 9½ A. M.

The President in the chair.

Prayer by Rev. Mr. Peabody.

The reading of the proceedings of the last session was dispensed with.

Mr. Earl: I have a short paper here, which I wish to read. The members of the Illinois delegation attending the meeting desire to express their gratification with the pleasant courtesies extended to us by our brethren of Missouri, and, especially, with the very generous and agreeable hospitalities we have enjoyed in the various hotels in

this city, whose liberality will not be forgotten. We desire, if agreeable, that this be sent to the publishing committee.

The President: It will be done, unless objection is made.

Dr. Morse read the report of the Committee on Wines, as follows:

REPORT OF THE WINE COMMITTEE.

The committee appointed to examine and report in regard to the wines on exhibition, respectfully submit the following:

We find one sample of Hartford Prolific of good body, very pleasant and agreeable character—unanimously pronounced a good summer wine, made by G. Husmann, of Hermann. This is believed to be the only sample of the kind which has at any time been exhibited here, which deserved to be called wine.

One sample of Cassady was very fair, but not as good as heretofore exhibited of this variety, made by G. Husmann.

One sample of Catawba of 1864, very pleasant and good—not extra—as decided by the committee, made by B. Petrus, Hermann.

Eight samples of Catawba of 1865, with one exception very good. The sample by Michael Pœschel was decided best. Second best, by Dr. Hull, of Alton, Illinois. Third best, by Nicholas Grein, of Gasconade Ferry, Missouri.

Two samples of Herbemont, both good. Best, by. G. Husmann. Second best, by Wm. Pœschel, of Hermann, Missouri. These two samples were different in appearance and character. That by Mr. Pœschel had considerable color, and would be classed as a light red wine, while the other was truly a white wine. The former had evidently been fermented upon the husks, skins and stems, giving it color, and an astringent, though not disagreeable taste. The other was decided to possess most of the flavor and character of the Herbemont grape.

Two samples of wine from native wild grapes—one was too sweet; the other, which was really a good wine, was made by G. Husmann.

One sample of Concord, 1864, by Wm. Pœschel, was pronounced good. Three samples Concord, 1865, that by Michael Pœschel, best. Second best, by Wm. Pœschel. Third best, by G. Husmann. These samples were all good, and the vote in regard to the merits of them was nearly equally divided.

One sample of Rulander, by G. Husmann, was decided to be very fine indeed.

One sample of Delaware, by G. Husmann. The bottle had been broken and the remains put into another bottle. The committee could not consider it a fair test of the variety, but notwithstanding the disadvantage, it was a very superior wine.

One sample of Clinton, by G. Husmann, was considered a first quality of light red wine, of a character medium between Burgundy and Claret.

One sample of Norton's Virginia, of 1864, by Wm. Pœschel, was decidedly excellent. Six samples of the same variety, of 1865. The best, by N. Grein, of Gasconade Ferry. Second best, by Michael Pœschel. Third best, by Wm. Pœschel.

One sample of Cynthiana, by Wm. Pœschel. This sample, to use the almost unanimous expression of the committee, was "a little ahead of the Norton's Virginia," which must be considered high praise, in view of the high character which the latter has maintained. It is decidedly the best of the red wines heretofore produced in this country.

The wines exhibited, with but one or two exceptions, were good; and notwithstanding the unusually unfavorable season, the wines of 1865 have maintained their former character of good body, and distinctively good quality. The majority of the samples were from those who have been exhibitors every year. The wines from Hermann were considered but little, if any, inferior to those formerly exhibited from that place, and a new merit is due to the vine growers of Hermann for bringing before the Society several new varieties. The sample of Hartford Prolific, by G. Husmann, proves that a good wine can be made of that grape.

The Cynthiana, by Wm. Pœschel, is new and of unsurpassed merit.

The vine growers of Gasconade Ferry have often been awarded first merit by this Society, and have again received it this year.

One new exhibitor, we think, is deserving of mention. There was one bottle of wine without label or mark of any kind. It was tasted to ascertain to what class it belonged, and was then put in competition with eight other samples of Catawba, and came within a very few votes of taking first rank. We then found it was made by Dr. Hull, of Alton.

L. D. MORSE, *Chairman Committee.*

The President: The report is accepted, and will take the usual course, unless objection is made.

Mr. Mertfeldt: I have no fault to find with the report. Having been on the same committee, I feel called upon to determine one or two points. It has been customary to regard everything as not wine that is not made of the grape. Men, among other things, speak of blackberry and elderry wine. I believe the name is correct. It don't matter what we say or determine about it, people will call it wine made of fruit, and it is needless to protest against it. But the point I wish to call up is this: I want to hear from some gentleman who contributed wine, whether or not sugar was used in their preparation. I think my suspicion is correct, that several of the very best of the samples there had sugar in their composition.

Dr. Morse: Before anything more is said on that point, I wish to know of the member of the committee, who has just taken his seat,

whether the report of the committee as given, relative to the quality of the wines, accords with his opinion.

Mr. Murtfeldt: Yes sir. I stated that I had no fault to find with the report.

Mr. Husmann: As I was one of the largest exhibitors here, and as this question, which cannot be avoided any longer, has been brought up, it may as well be discussed now as ever. It is a well established fact, and I suppose no intelligent person, any ways free with his wine making, is unacquainted with it, that for some time sugar has been used in the manufacture of wines. In Europe, among others, Ludwig Gall introduced this method. The necessity was this: that in Europe they had many seasons which did not produce what may be called a normal wine, viz: a wine which has the proper proportions of sugar acid and aroma of a first class wine. In very many seasons they cannot in Europe produce such wines, and that brought out this method. Gall made a scientific examination of the matter, and came to the conclusion that in pure wines the grape had a superabundance of acid, and to bring these wines to the state of normal wines, water would have to be added to dilute the acid to the proper proportion, and sugar would have to be added to bring that part up to the proper proportion. This was of course to be added before fermentation. This method has been tried and tested, and Gall was even arraigned and tried on the charge of adulterating wines; and he stated then, in his defense, that he was willing to have his wines analyzed by the best chemists of the country, and if they stated that there was anything in them injurious to health, he was willing they should go down. They were tested, and the verdict was, unanimously, that there was nothing in them injurious to health, and that they were as fully beneficial as the other wines produced from the pure juice of the grape.

This last season has been one of those in which the grape juice had a great excess of acid, and a perceptible lack of sugar. Now, the question arises, what are we to do in such seasons? Are we to make wines which nobody will drink, which will find no sale, which are even injurious to health, by the excess of acid, or are we to make a good palatable wine, which will find a ready sale, by using sugar and water? I think no sensible man will hesitate long which course he will pursue. I, for one, am free to say that in nearly all—not all—the samples which I had before the committee, sugar and water were used. For when we have a grape juice, as for instance the Catawba this year, which, instead of weighing 90 or 95, weighed only 52, I ask what wine could be expected from such juice?

The question must be met fairly and squarely, and the sooner we do it the better. I know there is a prejudice existing against the use of sugar, and in good seasons, when a normal wine can be produced, I would certainly use no sugar; but in such seasons as this has been, if by a proper and scientific treatment we can make a good wine, by adding ingredients which are not injurious to health, but simply are

what ought to be in the grape juice already, I cannot see the disadvantage arising from such treatment.

Dr. Morse: This Society has heretofore, and the wine committees especially, spoken strongly against sugared wines, and there were one or two samples yesterday before the committee too sweet, so much so as to be worthless; but there is a point which has not been understood generally, that there may be fermented sugar, or sugar may have been added which has undergone fermentation, and such wines would not be considered sugared wines; and now, I think the Society should take ground against wines which contain unfermented sugar. But if the system of Gall is understood, and the sugar is fermented, I don't see any objection to it. We judged of the wines with that view. Where there was no unfermented sugar the wines were considered good.

Mr. Pearson: To test the sense of the Society in this matter, I would like to offer a resolution. I am glad that this thing has come up, for this Society has decided the other way, for there has been no distinction made heretofore between adding sugar before and after fermentation.

WHEREAS, The crop of grapes in our country in many seasons fails to acquire sufficient ripeness to insure a good article of wine, being deficient in sugar and having an excess of acid matter;

Resolved, That the addition of sugared water to the must of the grape previous to fermentation is in many cases of great benefit to the wine, and is justified by the practice of the best manufacturers of Europe and the United States.

Dr. Dyer: I should like to insert in that resolution, the words "of water and sugar, without any limit or extent." We speak of sugar in the wines. Now, I think I know something about wines, and no one who tries these wines that were presented yesterday will find any sugar in them. There was sugar in the must of these wines, but there is no sugar there now, the chemical change which made the wine destroyed that sugar—made it something else. But, if we in this resolution advise sugar and water to be put into the juice of the grape in any unlimited quantity, we might as well say get tartaric acid from the apothecary, sugar from Belcher's, and water from the pump. I protest against it. Sugar is a good thing, but sugar in wine isn't a good thing. I hope we will not pass that resolution. And the resolution says, also, that in the State of Missouri we cannot ripen our grapes properly. I think we ripen our grapes here as well as they do in any part of the world.

Mr. Husmann: My friend Dr. Dyer has just remarked that we can always ripen our grapes here. True, we may ripen them—that is, call them ripened, by an act of courtesy; but between a thoroughly ripened grape and a grape that has come to a sort of unripened ripeness, there is a great difference. I have seen but very few grapes, this season, except the Concord, that were fully ripened, and even that grape did not attain the same perfection as last year.

Now, what are we to do such seasons? Are we to go to work and make the juice of the grape into wine, which nobody will buy or drink, or are we to add artificially what nature has denied us that season, for we do no more; and therefore, I can see no reasonable grounds which this Society could take against the improvement of the wines in bad seasons. In good seasons, I would be the last to do it, but there are seasons which imperatively call for it.

Mr. Murtfeldt: In the vintages of Europe there are certain ones of superior excellence. When good, the wines of that particular year have the reputation of being superior wines. Why not pursue the same course here? If you have a poor wine year, and it is necessary to add sugar, then let the public so understand it.

Mr. Peabody: I just rise to ask Mr. Husmann one question I would like to inquire, for information, whether he and other wine makers around Hermann are in the habit, in good years, the very best years, of adding sugar or sugar and water to the juice of the grape.

Mr. Husmann: I believe I have stated before that I would not do so, and have not done so when nature has done it for me.

Mr. Pearson: They speak of the crops of certain years—of the wines being of good quality. In the last fifty years how many good crops do they record in Europe? Just four. There is no chance at imposition; sugar that is in wine that has not undergone fermentation can always be detected. In Europe they use sugar made from the potato, which is nearer like the sugar in the grape than cane sugar is.

Mr. Colman: I will not speak first of the propriety of sweetening the must, but I will say something about the propriety of this Society passing such a resolution as this. I think its influence upon the State will be bad. We have been cultivating wine here for a great many years; we have been producing good wines—wines that have found a ready market, at reasonable prices—wines that have not had the addition of sugar to the must; and I had hoped that the reputation which our State and our soil and climate had gained was a substantial one, and would be beneficial to the State in inviting to it immigrants from all parts of the world to come and settle here on three million acres of wine land, and go to producing the grape, without having to add sugar. If wine has been produced heretofore without adding sugar, why can it not be again? Why will men follow theories, and run them clear to the extreme? You just let a man like Dr. Hull, or anybody else, come out with something new, and there are a lot of crack-brained men, all over the country, who will never know where to stop. If they find they can add sugar to this must, they will not know where to stop; and it will not be the Catawba alone, but every kind of wine we produce, that is sweetened. If we pass this resolution, in will come our sweetened wines. You may object to it, but the producer will say, "Why, sir, here are the documents; you have recommended sweetening the must, when you think there is a lack of sugar, and we have followed your directions." They

will sweeten all the wines they have for sale, and you will find a sweetened commodity all over the country. The people are not good judges of wine—how few are? I have been on the wine committee for six years, and I am not a good judge yet. Ninety-nine out of one hundred will take the sweetened wines in preference to the wines of the best vintage. Then those who produce it will say, "We have the sanction of the Missouri Horticultural Society for doing it." I say you will see the market flooded with just such wines as that. Now, if we have to sweeten the wines, don't let this Society tell the people to do it. If men will do so, let them do so and take the consequences, whether of benefit or injury to their reputation as wine producers, on themselves. I am not talking about the propriety of doing it; but I am talking about the propriety of this Society recommending it. If we cannot ripen up the grape here—not even the Concord—let us get some variety that we can ripen up perfectly. It is time for us to eschew varieties that cannot be ripened in this warm climate, on our sunny hillsides. I am not much surprised at the statement of Mr. Husmann, when he says that not even the Concord ripened perfectly this last season about Hermann, where the vines were permitted to over-bear, as they were in every vineyard. I was at Hermann this year, and I saw that the thrip had taken off the foliage, and the vines were over-loaded.

Mr. Jordan: I wish to say but a few words. I, for one, like candor above all things in a deliberative assembly. I have been very much pleased with the candor of Mr. Husmann, and I think we have already, by a most unqualified verdict, recommended the sweetening of wines, for the wines presented to the committee have been recommended as good wines. I don't see the difference between a man raising a crop of grapes, pressing out the juice, weighing it, and finding it fall below a certain standard, and his adding certain ingredients, such as are found in the pure juice, as it is sometimes found. For instance, if we find our must has not sufficient tartaric acid, whether we put it in from the vine or from vinous fermentation, I don't see the difference. In regard to the adulteration of wines, I think that is an entire different thing. I think our market is filled with manufactured wines, for want of something better. Let us, of all things, be candid in this thing.

At the request of the President, Dr. Edwards took the chair.

Dr. Clagett: I would like to say a few words on this subject. For several years this Society has most decidedly disapproved of and discountenanced the use of anything as wine but the pure juice of the grape. No longer ago than year before last a great deal of sport was made of calling anything wine at all but the pure juice of the grape. Wines have been brought here from parts of the country where they couldn't ripen the grape, and they have been discountenanced and thrown out. Now, for the first time, has wine been recommended when the vines have been permitted to overbear, and

been infested with insects, and they have added sugar. We have been boasting for years of the great adaptation of Missouri for the production of grapes that would make wine unadulterated; and shall we, the very first season that the grapes have failed, precisely reverse all our former actions on that account? I think that private growers need no encouragement to adulterate wines. I had hoped that Missouri would endeavor to retain her character for producing a pure juice of the grape. Our physicians have already, to a considerable extent, recommended to invalids the Missouri wine, because it is more reliable than any other. During the last few months it has come to my knowledge that the Norton's Virginia has been recommended as the best medicinal wine; and now we have come to-day, without due consideration, to recommend what we have, every year since this has been a society, repudiated in the most round terms. We have been noted for our repudiation of everything of this kind up to this time. I do say, sir, at last, that we should take this matter longer under consideration, to see whether these things are to occur so often, that we are to make a general practice of it. I do hope that the members of this Society will hesitate before they vote for this resolution. I do not know of anything that would be so damaging to the general interests of Missouri as to pass a resolution of this kind. I don't want to suppress the truth. I am willing that it should go out that the grapes in 1865 were not so perfectly ripened that a first-class wine could be made without the addition of grape sugar. I do not object to the use of it under such circumstances; but I believe that the gentlemen who have been under the necessity, to preserve their wines, of adding sugar, if they had kept them bearing in due bounds, they would not probably have been obliged to use sugar. If we are to encourage over-bearing crops, and the addition of these ingredients, we will have more wine for a while, but not so much in the end, because it will damage and discourage the grape growing interest. People are coming here, because of the reputation of the Missouri soil and climate for the grape. Then, again, I think an apology will be due to gentlemen for the treatment they have received here, if we pass this resolution. I hope the Society will pass another year before they attempt to pass this resolution.

Mr. Mudd: I don't know whether I admire candor any less than my friends do, but I think there is discretion to be used, as well as candor, on all occasions. I don't think it is necessary, in order to preserve our reputation for candor, to admit all our failings, or publish them to the would, if we don't admit them. I am sorry this resolution has been offered. It has been but within a very little while that we took a very different ground. Let us not advise or recommend that the juice of the grape be reduced or adulterated for the purpose of making wine. If it has to be done, let it be done without the advice and recommendation of this Society. I think it would be a fearful letting down from the position we have assumed in this matter before.

Whilst I would be candid about most things, I think we ought to have a little policy as well. If the past year has been an unfavorable one, we cannot find fault with our friends for making the best they can out of what they have. We are endeavoring, by every means in our power, to invite to our State the vine grower, and I think we ought not to advise him, in the experience of a single year, that we sanction the making wine of sugar and water, and recommend it, too. I shall not find fault with any one who makes use of sugar and water. I don't know enough about wine making to know whether it is proper or not, but if I was satisfied that it was, I would be opposed to adopting any such resolution.

Mr. Mertfeldt: I am exceedingly gratified to see that you are jealous of our reputation. I should vote, if I had a vote, against that resolution. I think the Society ought to keep up the former stand-point. If a gentleman presents a manufactured wine, it should be called a manufactured wine, and the pure wines should occupy a separate place. If you can't make a wine that is pure, let it be so understood by the committee; but keep up to your stand-point.

Mr. Pearson: I have accomplished the end I had in view in offering that resolution. I do not desire to press it to a vote; yet it seems to me that it is the most honorable position to occupy, and I think the Society will at last occupy it. When this course was first recommended in Europe, there were two classes of persons who opposed it. One, the honest class; they stuck to their principles, and bankrupted themselves; the other, that of the manufacturers, who had been doing it for twenty-five years, and making fortunes. I will ask the permission of the Society to withdraw the resolution.

Dr. Spaulding: I object to the withdrawal of the resolution; I want to vote it down.

Dr. Edwards: I am utterly opposed to the resolution, because of our former action. We have contended, and others more than I, that we should recognize nothing as wine, nor even give it the name of wine, if it had the addition of anything to the juice of the grape. That has been the ground we have taken, and the ground I have opposed, for one, in some of our former meetings, because I took the ground that wine proper is the juice of the grape fermented, without the addition of anything else, but that blackberry or raspberry wine is a wine with something else added to it. Mr. Husmann takes the ground that we should not call blackberry or raspberry wine wine at all. If we should not call that wine, we ought not to call wine wine that is made by adding anything to the juice of the grape. I said then that we should make classes of wine, and I say so still. In this report that has been presented they do not say whether this, that or the other sample was made without the addition of sugar. Now, I think that, in making this test, every man bringing in his wine for exhibition ought to be required to state how it was made, and, if he adds sugar, in what proportion; and we ought to have that appear if we want pure wine, even if we have

to test sweetened wines. It has always been contended heretofore that we can make pure wine; and if, in the past season, our grapes have not fully matured, in Europe it is the same thing. Once in a while they will have seasons when there is a greater amount of saccharine matter, and the wine keeps better, and the flavor is better. So it will be here and everywhere else; but to say that we shall recommend the adulteration of all our wines, and make no distinction, is all, to me, out of the question. We might say this, that when the season has been such that there is not a sufficient amount of saccharine matter to form wine that would keep, we would not condemn, in such cases, the addition of sugar; but I hope we will not pass that resolution.

Dr. Spaulding: I made an objection to the withdrawal of that resolution prematurely. I had just come in, and did not understand the purport of the discussion. I withdraw my objections to the withdrawal of the resolution.

Mr. Pearson: I again ask permission to withdraw the resolution.

The President: The resolution is withdrawn, unless objection is made.

Mr. Husmann: I would ask it, as a privilege, of this Society, to state a few simple facts on the subject we have had under discussion. We have had a great deal of talk, and very excited talk, from some of the members, about every tub standing on its own bottom, and all this, that and the other. Now, I think gentlemen here have entirely misunderstood the matter. I am opposed to the adulteration of wine. I would discountenance it utterly; but they have misunderstood a plain definition, and it ought to be observed that everybody failed to make a plain distinction; it is this: that in some seasons, when nature does not give the grape all the properties that it ought to have to produce a normal wine, we try to assist nature, on scientific principles, by adding that which she has denied us before fermentation. This is different from adding sugar after fermentation has taken place. I had no desire that this resolution should pass, and I have no desire to hide facts. I can call in Mr. Wolff here to say that I let him try all my wines, and after he had done so, and got my best, I got my diary and told him how every one of these wines was made, and he said he could not ask anything fairer.

I am willing to have these wines go before a committee, and stand a test with the pure juice of the grape as to purity. I am willing that they should go down so deep that they will never recover, if any chemist can show me anything in them which should not be in true wine itself. I am not anxious that this Society should sanction this matter; but don't talk to me of adulteration. I deny any such assertion. Do not confound the things.

Dr. Dyer: I didn't seem to be understood. I have said there was no sugar in these wines—the wines that showed free from sugar were discarded, and I say if the fact had not been told by the wine-makers

themselves, it never could have been told that sugar had been used in their manufacture. The best palate could not have detected it, and the best chemist could not have detected the sugar, for the reason that there was no sugar there. When sugar has been put in wine must, if in proper quantities, Liebig himself could not detect the first particle of sugar in that wine. There is a difference, which does not seem to be understood, between adding sugar before and after fermentation.

Dr. Spaulding: I feel that I ought to defend my position on a question of so much importance as this. In the first place, let me notice Dr. Dyer's remark. He says you can't tell the difference between wine that has had sugar added to it and that which has not. I say there is a difference that can be detected, and that is the essential difference between cane sugar and grape sugar. It is a difference that can always be detected.

Dr. Dyer: I refer to Dr. Gall himself.

Dr. Spaulding: I have no objection to adding sugar in such a season as this, for if the grape producer does not do it, he will make no wine, but vinegar. It is eminently proper, right and just that a man should add the requisite amount of sugar to make up the difference, or lose his product. Now, who is going to lose his product for the sake of an idea? I don't want to do anything for mere policy. I want to act fairly and squarely every time. I say, when it is right for a man to sugar his wines, we have no right to condemn the process; but I take the ground that when a man would be perfectly justifiable in doing it, he, like my friend, Mr. Husmann, should have the candor to say so; and thus I say these wines should not come in competition with pure wines before this Society.

Dr. Spaulding: I have a matter I wish to bring up here. We have been in the habit of appointing certain committees, and there has always been some expense attending the meetings of these commitees. I want to know whether the Society will pay these expenses? It comes in this way: the visit to Mr. Shaw's garden was attended with some expense, which I paid myself. I think we ought to decide the matter, so that persons who are appointed on committees may know whether they have to bear such expenses personally or not.

Mr. ———: I move that the Society pay such expenses as are incurred after committees are assembled. Carried.

Dr. Clagett: I move that a committee be appointed to examine and report a revision of our list of grapes for cultivation, and also the best mode of propagating grape vines, and another committee on the preparation of the soil and planting, and a committee on pruning and trimming the grape vine.

The President: There is a committee to report at this meeting on the subject first named.

Dr. Clagett: I withdraw that part of my motion, then.

Mr. Husmann: I think if there are to be committees of this kind,

one committee had better take charge of the whole. You will hardly find enough men who are competent and willing to fill more than one committee.

Dr. Clagett: I accept that suggestion as an amendment to my motion.

Mr. Kelly: I think that subject has already been ventilated to a reasonable extent. I admit that is necessary at this time to appoint a committee for that purpose.

Dr. Clagett: As to expense—this is not a committee of that kind. I am thoroughly satisfied, and I think our transactions show, that a well digested report of a committee brings a matter before the Society so that it can be discussed to a better advantage. It is, moreover, an advantage to every member who executes the trust given to him. Though we are making progress, there are questions still mooted, and we want all the knowledge we can get. It will cost the Society nothing but to appoint the committee.

The motion of Dr. Clagett was carried on a division of the house.

REPORT OF TREASURER.

JOHN H. TICE, Treasurer, in account with Missouri State Horticultural Society.

DATE.	SPECIFICATION.		AMOUNT.
	DR.		
January 1, 1865.	For balance of cash on hand		$ 2 30
January 10, 1865	Basket of flowers presented by H. A. Homeyer, Esq., and sold to E. Richards, Jr.		21 00
January 10, 1865	Oranges presented by Captain Swon		50
January 10, 1865	Amount of annual membership of one hundred and forty-three members		143 00
			$166 80
	CR.		
March, 1865	By amount paid Woodson, Janitor	$10 00	
March, 1865	Amount paid H. T. Mudd, sundry bills	48 00	
January 1, 1866.	Amount of cash on hand	74 80	
January 1, 1866.	Amount paid William Muir, Secretary	34 00	$166 80
January 1, 1866.	To balance brought down		$74 80

President: The report is accepted, unless objection is made.

Mr. Tice: I wish to offer the following resolution:

Resolved, That the Missouri State Horticultural Society will hereafter hold a fall meeting for exhibitions of fruit and discussion, on the week of the annual fair of the St. Louis Agricultural and Mechanical Association.

We are always meeting here in January, consequently we see the same varieties of fruits year after year. I presume that hereafter our annual fairs will be regularly held, and we can then exhibit our fruits and have our discussions after night, and in that way attain the object aimed at, by having our annual meeting at an earlier day.

Dr. Clagett: It seems very appropriate that inasmuch as we have

always had an exhibition of fruits at that meeting, that it should be in the proper hands. I hope it will pass.

Mr. Colman: I have been through that operation several times, and I know what the result will be. I know that I can't have it voted down. I am only going to say that the whole thing will simply be a failure. The fruit itself will overwhelm everything else, all interests center there, and people are so tired that they will not assemble anywhere else for discussion in the evening.

Dr. Clagett: This is only an effort to try to make that exhibition a better one than it has been before—there will be one anyhow.

Mr. Saxton: If that meeting is brought together, things will be too much mixed, and we shall be left out in the cold entirely.

The resolution of Mr. Tice was carried.

Mr. Husmann then read a report of the Committee on Vineyards, comprising a list of grapes for general cultivation, etc.:

FOR GENERAL CULTIVATION—*For Wine:* Concord, Norton's Virginia, Herbemont, Clinton.

For Table and Market: Concord, Herbemont, Hartford Prolific.

PROMISING WELL—*For Wine:* Cynthiana, Arkansas, Cunningham, Taylor, Creveling, Martha, Alvey, Delaware, Louisiana, Rulander.

For Table and Market: Perkins, Blood's Black, Rogers' Hybrid, No. 1, North Carolina Seedling, Martha, Maxatawney, Clara, Union Village.

G. HUSMANN.

On motion, the report was filed for publication.

Mr. Jordan then read the report of the Business Committee, as follows:

The Business Committee respectfully submit the following resolutions:

Resolved, That the Secretary issue warrants on the Treausurer, as follows:

For printing and express charges	$32 65
Expenses of committee visiting Mr. Shaw's garden	10 00
Mr. James Quigley, fitting up rooms and attendance	15 00

Resolved, That the Secretary issue warrant on the Treasurer to pay Messrs. Barler and Allen for reporting and preparing the minutes of the present session for publication, as per agreement with the Business Committee, forty dollars for taking the notes, and five dollars per day for writing them out for publication, the whole not to exceed one hundred dollars.

On motion, it was ordered that the bills reported by the committee be allowed, and warrants issue for their payment.

The Business Committee then reported the following resolutions:

Resolved, That the thanks of this Society are hereby tendered to the Rev. Mr. Peabody, the Rev. Mr. Coe and the Rev. Mr. Barler, for

assisting us in our good work, by opening the daily meetings with prayer.

Resolved, That the justices of the County Court of St. Louis county, by affording to this Society the use of the spacious rooms in the court house for our present session, without charge, merit the warmest thanks of the members, which are hereby tendered.

Resolved, That the thanks of the Society are hereby tendered to Mr. James Quigley.

Resolved, That we tender our sincere thanks to the proprietors of the Lindell Hotel, Planters' House, Barnum's Hotel, Olive Street Hotel, Everett House, Western House, Galt House and City Hotel for their kindness and generous hospitality in entertaining the delegates to this Society from abroad without charge, thereby showing their due appreciation of the labors of those engaged in furthering the advancement of the fruit and wine interests of the great West, and would recommend the above named hotels to horticulturists as worthy of their patronage. And your committee regrets to say that the Southern Hotel, that has been opened the last year, chose to vary from the precedent so long established by all the first class hotels of the city, by not reciprocating the many favors bestowed on them by horticulturists, but refuse to entertain our guests.

Resolved, That the thanks of this Society are hereby tendered to the Iron Mountain, North Missouri, Pacific and Chicago Railroads, for returning members from this meeting without charge.

Mr. Husmann: I understand that my friend Dr. Morse has collected notes on vineyards. I would like to hear them read. I think thus far the grape subject has received rather a cold shoulder.

Dr. Morse: I am very much surprised at this call, for I have nothing of that kind prepared. As a member of the Vineyard Committee, I had but very little time to give to that work. I was obliged to go East at that very time. I did make it my business to visit the vineyards of E. R. Mason and Mr. Walters. I took some notes, but they are scarcely in a shape to be of any importance to the Society. My notes on Mr. Mason's vineyard were published in the *Rural World*.

Mr. Peabody: I would like to inquire if the committee on the President's address have made their report.

Mr. Colman: I will state that I expected to prepare a report on that address last night, but was prevented from doing so.

The most important part in that address was in regard to the incompetency of the head of the Agricultural Bureau, and that matter the Society attended to yesterday.

This Society deeply feels the loss of Mr. C. R. Overman, whose death was alluded to in the address. I never knew a man with a bigger heart. No one knew him but to love him.

We most all concur in the observations of the President in regard to the tree peddlers—they are sucking the life blood out of our people.

Dr. Clagett: I do hope that some ready pen will write a resolution on that subject.

Mr. Colman: Another thing alluded to in the address, was the propriety of building a horticultural house, a fruit bazaar in St. Louis, where producers can send their commodities for sale. Such a thing will be built.

Dr. Clagett: I will remark to the members here, that I would cheerfully coöperate in everything that would advance the interests of the fruit growers. In the mean time, until something better is done, I will state that it is my purpose, with some of my sons, to open a fruit house, which we intend to make a permanent business, where it will be headquarters for all fruit growers who may be pleased to visit us.

Dr. Morse: The Horticultural Society will be entitled to one thousand volumes of the agricultural and horticultural reports. I move that the President be authorized to take charge of these reports, and distribute them to those who are entitled to them. Adopted.

Dr. Clagett: I offer the following resolution:

Resolved, That this Society condemns in the strongest terms the *tree peddlers* that infest our State, and supply articles of no value to the planter, to the great loss and injury of the planter, and the great hindrance of horticultural progress in the State, and fully indorse the expositions given by the President of this Society in his annual address.

Mr. Allen: I would like to know whether that is meant to embrace the agents of nurseries in our neighboring State.

Mr. Colman: I hope it does. I don't think any nurseryman who thinks much of himself, will send out irresponsible men to distribute his trees among the public.

Dr. Clagett: In all nurseries there is refuse stock, and men go out and get orders for all of that they can dispose of.

Mr. Allen: I have never myself bought trees from or given orders to these agents, yet I have known some very respectable men employed by nurserymen of this State, and in the neighboring State of Illinois. I will mention a Mr. Babcock, an agent through our section of the country, soliciting orders last fall in the name of the firm. I wish to know whether these agents of respectable nurserymen are denominated "tree peddlers."

Mr. Muir: There are two points under that which deserves some action. One of them is this: that a number of these men who carry the names of responsible nurserymen with them, sell a great deal of trash that the responsible nurserymen have nothing to do with. Another point is, if you adopt this resolution, you ought to adopt a resolution advising whom you should buy from.

Mr. Colman complimented the *Missouri Democrat* for the attention it had given to the proceedings of this Society.

The President: I desire to state that all the presses of the city have published notices of our meetings freely without charge.

Mr. Merfeldt: I desire that the reports of the committees on fruit and wines be published.

Dr. Hull: Last year this Society voted that no sugared wines should come in competition with the pure juice of the grape. I had wines that, under that rule, I could not exhibit. Since you have received the report of your committee, in violation of that rule, I move that that action be rescinded.

Mr. Muir: I think Dr. Hull is under a misapprehension. The idea was to divide the wines into two classes—sugared and unsugared.

Mr. Colman: It was resolved that wines that had been made by adding sugar should not come into competition with wines made from the pure juice of the grape, and if the committee has allowed these two wines to come into competition, it has been done antagonistic to the instructions of this Society, and the matter ought to be investigated. But I am not in favor of Dr. Hull's resolution, because two wrongs don't make a right.

Dr. Edwards: That is just the thing I called for when the matter was under discussion before. I wanted to know whether this Committee on Wines had reported in accordance with those resolutions of the Society. They were separated heretofore, and I wanted them separated in this report.

Dr. Clagett: I do hope that we will, in this Society, keep a committee whose duty it shall be to report on the pure juice of the grape.

Dr. Morse: In behalf of that committee, I would say, that we acted just as we always have acted—any wine that contained unfermented sugar we rejected; other wines we rejected upon their qualities, and the Society can act upon the manufacturing part.

Mr. ——: The committee can't find out whether sugar has been added or not.

Dr. Hull: That is just what we want to get at. It can be found out; and I want to have a committee appointed who will be able to come at that point.

On taking a vote, Dr. Hull's motion was lost.

Mr. Colman: Now, sir, I move that this report of the committee be returned to the committee, and that that committee be instructed to make a report in accordance with the rules and regulations of this Society.

The President: The report has not yet been presented to us in a perfected form. You are out of order.

Mr. Colman: I move that the committee be instructed to report, when it does report, in accordance with the rules and regulations of the Society.

The President: It seems to me that we are entertaining a motion we have no right to. We have no evidence that the committee will report otherwise.

Dr. Dyer: I am astonished, at this late hour, that a gentleman who was appointed on that committee, who left the wine committee when

he should have been with it, should make a motion of this kind at this time.

Mr. Colman: I suppose the gentleman is astonished at a good many things, and will be at a good many more. I rise for an explanation. I think I heard a verbal report from the Chairman of the Committee on Wines, in which report these wines did come in conflict. Now, I ask if it isn't in order to instruct that committee not to let those two classes come in conflict, but to report in accordance with the rules and regulations of this Society?

Dr. Edwards: I move that the committee be instructed to report on the wines that are unmixed by the addition of sugar to the must, or anything else, and, also, on those that have been improved and mixed.

Mr. Husmann: I have refrained from saying one word until now, because some gentlemen might think me interested in the matter; but it would, certainly, be placing the committee in a very disagreeable position, and I don't know how they would get out of it. The wines were to be submitted to that committee without a list of the contributors. They decided on them simply on the evidence of taste and smell. They selected what they considered good wines; they were unable to detect sugar in them. Now, how are they to find out which of these wines are sugared, and which are not. I, for my part, am candid enough to say that all of mine had more or less sugar in them. But how is the committee to say, at this late hour? If these lists of contributors had been made before the committee decided, then it might be possible; but now, I think it would be placing your committee in a very awkward position to require this of them.

Dr. Edwards: Heretofore we have had two committees appointed. This time, we had but one. It may not be in their power, now that the wine has gone down their throats, to determine or ascertain, so as to make a correct report; but I hope, at least, that hereafter this Society will take such further action as will forever keep separated these wines, for we want to let it be known what we can make without the addition of sugar.

Dr. Morse: I have no objection to either of the resolutions, that I know of, and I will make my report in accordance with the regulations of the Society. If the object is to have the committee distinguish between Gallized wines and the normal, I can only say that it will be impossible to do so.

Mr. Jordan: I had the honor to be a sort of clerk to that committee. They did not see the bottles that the wines they tasted came from, and could not have known who made the wines.

Mr. Colman: I move that the whole matter be laid on the table. Carried.

Dr. Clagett: I move that we now adjourn. Carried.

The President: The meeting now stands adjourned *sine die*.

MISSOURI STATE HORTICULTURAL SOCIETY.

OFFICERS FOR 1866.

HENRY T. MUDD, *President*, St. Louis.

VICE PRESIDENTS.

GEORGE HUSMANN, Hermann.
O. H. P. LEAR, Hannibal.
BARNABAS SMITH, Cuba.
DR. B. F. EDWARDS, St. Louis.
DR. W. S. DYER, Jefferson County.

C. M. SAXTON, *Corresponding Secretary*, St. Louis.
WM. MUIR, *Recording Secretary*, Fox Creek.
JOHN H. TICE, *Treasurer*, St. Louis.

STANDING COMMITTEES.

On Business.—Dr. L. D. Morse, Rudolph Bircher, Jas. A. Bayles, Adolph Kehr, John Henwood.
On Entomology.—Dr. E. S. Hull, Wm. Muir, John H. Tice, Dr. B. F. Edwards, E. M. Avery.
On Vineyards.—W. C. Flagg, George Husmann, L. D. Morse.
On Orchards.—John H. Tice, Jonathan Huggins, T. R. Allen.

SPECIAL COMMITTEES.

To report Lists of Fruits for Missouri, on the plan of the American Pomological Society.

On Apples.—J. J. Kelly, S. F. Taft, Wm. Pœschel.
On Pears.—John H. Tice, B. Smith, C. T. Mallinkrodt.
Cherries.—Carew Sanders, J. H. Paddleford, L. D. Votaw.
Nectarines, Apricots, Plums and Quinces.—Wm. Muir, O. H. P. Lear, Charles Connon.
Native Grapes.—George Husmann, Dr. H. Clagett, E. R. Mason.
Foreign Grapes.—Wm. Glasgow, Jr., C. H. Haven, Henry Michel.
Strawberries.—S. M. Bayles, R. S. Elliott, O. Quinette.
Blackberries, Raspberries, Currants and Gooseberries.—J. M. Jordan, T. W. Guye, John T. Walter.

The Fruit Committees should report to the Recording Secretary by the first day of August, that he may have time to arrange the same for the convention to be held the first week in September.

Committee of Arrangements for Meeting of American Pomological Society.—N. J. Colman, C. W. Spaulding, Col. W. P. Fenn, Josiah Fogg, J. P. Helfenstein, Wm. D'Oench, Wm. T. Essex, C. M. Elleard, R. S. Elliott.

REVISED LAWS OF MISSOURI,

FOR THE

ENCOURAGEMENT OF AGRICULTURE.

SECTION 1. A Board of Agriculture is hereby instituted and created a body corporate, by the name and style of the "Missouri State Board of Agriculture," and by that name shall have perpetual succession, power to sue and be sued, complain and defend in all courts, to make and use a common seal, and to alter the same at pleasure.

SECT. 2. The persons named as corporators of the Missouri State Board of Agriculture heretofore existing, and the duly elected officers thereof, are hereby constituted the officers and members of the Board of Agriculture hereby created, until their successors shall be duly elected and qualified.

SECT. 3. The Missouri State Board of Agriculture shall, at their next annual meeting, in addition to filling the vacancies then occurring, elect two additional members, and the Governor of the State and the Superintendent of Public Schools shall be, *ex-officio*, members of the Board. Immediately after the State Board of Agriculture has been increased to twelve elected members, as herein provided, said twelve members shall, by themselves and by lot, be divided into three classes of four each, numbered one, two and three. The term of service of class number one shall expire at the annual meeting in 1867; of class number two at the annual meeting in 1868, and of class number three in 1869; and at the annual meeting in 1867, and at each annual meeting thereafter, there shall be elected four members, for the term of three years, to fill the vacancies occurring by expiration of term of service; and any vacancies occurring in unexpired terms of service, shall be filled by election for the unexpired term. In case of failure by the president or delegates of county agricultural societies to fill vacancies at the annual meeting, the Board shall have power to fill the same by election.

SECT. 4. The officers of said Board shall be a president, secretary and treasurer, and such other officers as said Board shall deem necessary, who shall be elected at the annual meeting thereof, and shall serve for one year, and until their successors are duly elected and prepared to enter upon the duties of their respective offices.

SECT. 5. The Missouri State Board of Agriculture, and their successors shall have power to adopt such by-laws and make such rules and regulations for the government of said Board and the management of its affairs and business, as they may deem best calculated to promote the interest of agriculture, and as shall not be inconsistent with the constitution and laws of the State of Missouri and of the United States.

SECT. 6. There shall be held, in the city of St. Louis, on the first Wednesday of December of each year, an annual meeting of the Board of Agriculture, together with the president of each county agricultural society, or other delegates therefrom, duly authorized, who shall, for the time being, be, *ex-officio*, member of the State Board of Agriculture, for the purpose of deliberation and consultation as to the wants, prospects and condition of the agricultural interests of the State, to receive the reports of the district and county societies, and to fill, by elections, all vacancies in the State Board of Agriculture. The president, also, shall have power to call meetings of the Board whenever he may deem it expedient, and at any meeting of said Board seven members thereof shall constitute a quorum for the transaction of business.

SECT. 7. It shall be the duty of all agricultural and horticultural societies, organized and established in accordance with the laws of this State, to make a full report of their transactions to the Missouri State Board of Agriculture, at each annual meeting thereof.

SECT. 8. It shall be the duty of the said Board to make an annual report to the General Assembly of the State, embracing the proceedings of the Board for the past year, and an abstract of the reports and proceedings of the several agricultural and horticultural societies, as well as a general view of the condition of agriculture and horticulture throughout the State, accompanied by such recommendations, including especially such a system of public instruction upon those subjects as may be deemed interesting and useful.

SECT. 9. The sum of one hundred dollars is hereby appropriated out of any money not otherwise appropriated, for the use of the Board, and an account of the expenditures of the Board shall be included in the annual report to the General Assembly.

SECT. 10. The Public Printer shall, annually, under the direction of the President of the State Board of Agriculture and the President of the State Horticultural Society, print and bind, in one volume, six thousand copies of the annual report of the said Board of Agriculture and the proceedings of the State Horticultural Society, thirty-eight hundred copies to be for the use of the General Assembly, two hundred for the State Library, one thousand copies for the State Board of Agriculture, and one thousand copies for the State Horticultural Society, for distribution to the agricultural, horticultural and mechanical associations throughout the State.

OF COUNTY AGRICULTURAL AND MECHANICAL SOCIETIES.

SECTION 1. Whenever fifty freeholders within this State shall present a petition to the County Court of the county in which they, or a majority of them, reside, setting forth that they desire to organize and be incorporated for the purpose of promoting improvements in agricultural manufactures and the raising of stock, and the court shall be satisfied that such petitioners are freeholders of this State, the court shall, by an order, declare the petitioners incorporated for the purposes specified in this section; and thenceforth the petitioners shall be a body politic and corporate, by the name and style of the (naming it) county agricultural and mechanical society, and by that name they and their successors shall be known in law, have perpetual succession, sue and be sued, plead and be impleaded, defend and be defended in all courts and in all actions, pleas and matters whatsoever; and shall have power to purchase, hold and receive any quantity of land not exceeding thirty acres, with such buildings and improvements as may be placed thereon, and any other property not exceeding in value ten thousand dollars; and may convey, lease, sell and dispose of the same, or any part thereof, for the benefit of the society, and may have a common seal, and break and alter the same at pleasure.

SECT. 2. Within thirty days from the date of the order of the County Court, any number of the petitioners exceeding twenty may proceed to organize such society by electing nine directors, who shall hold their offices one year, and until their successors are elected; and the directors, when so elected, shall collectively form a board for the government of such society; and in such board shall be vested all the corporate powers and duties of every society incorporated as provided in this chapter; and, for the purpose of electing the directors, there shall be held, annually, a general meeting of the members of the society. All vacancies in the board of directors shall be filled by appointment of the board. No person, not a member of the society, shall be a director.

SECT. 3. Every board of directors shall assemble within twenty days after their election, and choose a president of their number, and some other persons as secretary, treasurer, collector and such other officers, servants and agents as may be necessary, remove them from office and prescribe their duties; and all proceedings of the board shall be public.

SECT. 4. It shall be the duty of the president to preside at all meetings of the board and of the society, and in case of his absence, such other person as the members present shall appoint; and it shall be the duty of the secretary to keep a record of the proceedings of the directors and of the society; and the treasurer shall give bond and security, to the acceptance of the board of directors, for the benefit of the society, in such sum as they, or a majority of them, shall determine, conditioned that he will faithfully receive and pay over, on their order, all moneys or other articles, the property

of the society, that may come into his hands as treasurer, which bond shall be deposited with the secretary of the board of directors; and the said treasurer shall keep fair and accurate entries of all moneys and other articles by him received as treasurer, and from whom received, and to whom and for what purpose paid out, and make report of the financial operations of his office as often as he may be directed by the board of directors.

SECT. 5. The said board, a majority of whom shall form a quorum, shall have power to make, ordain and adopt a constitution and all necessary by-laws, ordinances, rules and regulations for the government of the board of directors and of the society, and for the promotion of the objects for which it is designed; and the president of the board shall cause the same to be carried into effect; *provided*, such constitution, by-laws, ordinances, rules and regulations shall not be inconsistent with the constitution and laws of this State.

SECT. 6. All moneys paid by members and others, and donations made to the society, shall be apropriated, under the direction of said board, in conformity to such constitution, by-laws, rules and regulations as may be ordained and established for the government of the society and for the advancement and encouragement of the objects of the society.

SECT. 7. The County Court of any county in which there shall be a society, organized according to this chapter, or any special act or incorporation, shall have the power and may, if it shall be deemed expedient, appropriate out of the county treasury, for the benefit of the society, the sum of one hundred and fifty dollars in any one year; and the money so appropriated shall be drawn by the treasurer of the society in a proper warrant; *provided*, said money shall be annually awarded by the board of directors in premiums or expended by them in the purchase of premiums, to be known as "the (name the county) county court premiums," to be awarded according to the rules, regulations and by-laws of the society; *and provided further*, that not more than one such premium shall be awarded to the same animal or article of exhibition by the same county society.

SECT. 8. At each annual meeting of the society the board of directors shall report, in writing, the number of members and the financial condition of their society; the quantity and character of property owned by it, and the quality and cost of improvement of the same; the number and value of premiums awarded at their annual fair; the number and character of animals and articles exhibited; a statement of the probable quantity of the staple commodities of the county, and prices current thereof, and such other information in relation to the agricultural and mechanical interests of the county as they may deem worthy of general notice; and a copy of the report so made shall be transmitted to the Board of Directors of the Missouri State Agricultural Society (Missouri State Board of Agriculture,) to be disposed of as provided in the next succeeding section of this chapter.

SECT. 9. The Board of Directors of the Missouri State Agricultural Society (Missouri State Board of Agriculture) shall, at each session of the General Assembly of the State of Missouri, report faithfully all the facts, statistics and information contained in the reports transmitted to them from the county agricultural and mechanical societies organized and incorporated under the provisions of this chapter, and such other facts, statistics and information as they may gather from other counties in this State in regard to agricultural, mechanical and domestic manufactures and productions, and to the raising of the various breeds of stock.

SECT. 10. The land and other property which may be held by any society under the provisions of this chapter, shall be held by the society for the sole purpose, and none other whatsoever, of erecting inclosures, buildings and other improvements calculated and designed for meetings of the society, and for exhibitions of various breeds of horses, cattle, mules and other stock, and of agricultural, mechanical and domestic manufactures and productions, and for the purchase and importation, and the keeping thereof, of such foreign breeds of stock as the board of directors may deem advantageous to the interests of the county.

SECT. 11. The members of any society, organised under the provisions of this chapter, shall be composed of such persons, and none others, as shall have subscribed their names as such in the books in which the proceedings of the society and of the board of directors are or shall be recorded, and paid annually to the treasurer of the society such sum, not exceeding five dollars in any one year, as may be established by the rules, by-laws and regulations of the society as a membership fee; and such persons shall be members only for the year for which he shall have paid such fee.

SECT. 12. A duly authenticated copy of the order of the County Court, provided for in section one of this chapter, shall be filed and recorded in such manner as conveyances of lands are, by law, directed to be recorded in the office of recorder of the county, within three months after such order shall be made.

SECT. 13. The constitution, by-laws, rules and regulations of the society and board of direc-

tors shall be printed and circulated among the members of the society within thirty days after their adoption.

SECT. 14. Whenever a majority of two-thirds of the members of any society, organized under the provisions of this chapter, shall, at an annual meeting, declare such society dissolved, or if, from any other cause, said society shall be dissolved or fail to meet and pursue the objects of the society, for the period of five consecutive years, then the real estate and all other property held by it shall be sold for cash in hand, at public aution, before the court house door of the county, after thirty days' notice given in some newspaper published in the county, if there be one, and, if not, by ten printed advertisements set up in ten public places in the county, describing the property to be sold, and the time, place and terms of sale. Such sale shall be conducted by the directors, or a majority of them, chosen and elected as provided by this act.

SECT. 15. At any fair, show or exhibition, held by any incorporated agricultural and mechanical society, every person who shall, without the permission of the officers of such society, enter within any inclosure which may be used by such society as an agricultural and mechanical fair, and every person guilty of disorderly conduct, or such conduct as may interrupt or be prejudicial to the interests of such fair or exhibition whatever, within the inclosure for the same, or at distance within two hundred yards of such inclosure, shall be liable to immediate arrest by any officer of such society, and to the payment of five dollars to the society holding such fair, show or exhibition, to be recoverable at the suit of such society, before any justice of the peace of the county in which such fair, show or exhibition may be held.

SECT. 16. All agricultural societies in this State, established under the act above cited, and that have failed to keep up their organizations as required by the law approved November 23, 1855, are hereby authorized and empowered to pursue the objects of such societies and perpetuate their organizations as though no failure to observe the law had occurred.

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